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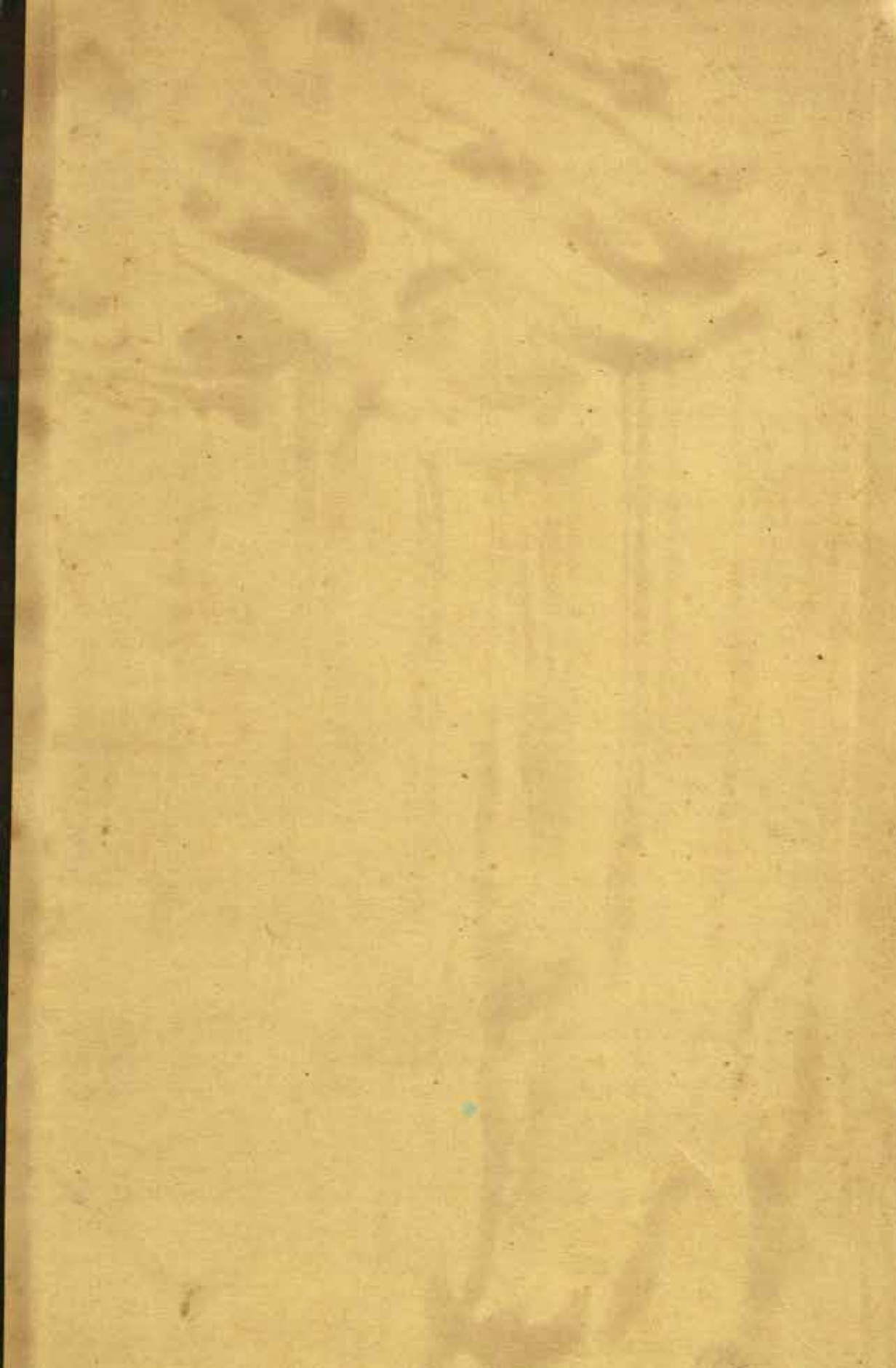
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THE JOURNAL

OF THE

ROYAL ANTHROPOLOGICAL INSTITUTE

OF

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A GREAT BRITAIN AND IRELAND.



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J. R. A. I.

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## ERRATUM.

*Addition to Contents:—*

|   | PAGE |
|---|------|
| XVII KROEBER, A. L., AND HOLT, CATHARINE, Masks and Moieties as a<br>Culture Complex ... .. 452 |      |





# CONTENTS.

|   | PAGE |
|---|------|
| Minutes of the Annual General Meeting, January 27, 1920 ... ..  | 1    |
| I. FLEURE, H. J. Some Early Neanthropic Types in Europe and their<br>Modern Representatives ... ..  | 12   |
| II. HUTTON, J. H., I.C.S. Leopard-Men in the Naga Hills ... ..  | 41   |
| III. THOMAS, N. W., M.A. Ashanti and Baule Gold Weights ... ..  | 52   |
| IV. HADDON, A. C., M.A. The Outriggers of Indonesian Canoes ... ..  | 69   |
| V. MOIR, J. REID. On the Occurrence of Flint Implements of Man in the<br>Glacial Chalky Boulder Clay of Suffolk. (With Plates I and II) ...                 | 135  |
| VI. SELIGMAN, C. G., M.D., F.R.S. Bird-Chariots and Socketed Celts in<br>Europe and China ... ..  | 153  |
| VII. PARSONS, F. G., F.R.C.S. The Colour Index of the British Isles ... ..  | 159  |
| VIII. BUXTON, L. H. DUDLEY. The Anthropology of Cyprus ... ..   | 183  |
| IX. HADDON, A. C., M.A. Migrations of Cultures in British New Guinea ...  | 237  |
| X. CLARK, W. E. LE GROS, F.R.C.S. On a Series of Ancient Eskimo<br>Skulls from Greenland ... ..   | 281  |
| XI. JENNESS, D. Papuan Cat's Cradles ... ..   | 299  |
| XII. MURRAY, G. W. The Nilotic Languages—A Comparative Essay ... ..   | 327  |
| XIII. SANDERSON, MEREDITH. Relationships among the Wayao ... ..   | 369  |
| XIV. THOMAS, N. W. Notes on Edo Burial Customs ... ..   | 377  |
| XV. JONES, NEVILLE. On the Implement-bearing Deposits of Taungs and<br>Tiger Kloof in the Cape Province of South Africa. (With Plate IIa.)                  | 412  |
| XVI. ROUTLEDGE, MRS. SCORESBY. Survey of the Village and Carved Rocks<br>of Orongo, Easter Island, by the Mana Expedition. (With Plates<br>III-XVII) ... .. | 425  |

## MISCELLANEA.

|   |     |
|---|-----|
| Proceedings of the Royal Anthropological Institute, 1920 ... .. | 461 |
|---|-----|

## ILLUSTRATIONS.

## PLATES.

## PLATES

*To face page*

|       |   |     |
|-------|---|-----|
| I.    | On the Occurrence of Flint Implements of Man in the Glacial Chalky Boulder Clay of Suffolk. View of part of north face of Pit No. 2, showing Chalky Boulder Clay Series of Deposits ... ..  | 152 |
| II.   | On the Occurrence of Flint Implements of Man, etc. Fig. 1, Upper surface of flint <i>pointe</i> , exhibiting streaky colouration. Figs. 2 and 2A, Two views of ochreous flake showing later edge-flaking, exhibiting streaky colouration ... .. | 152 |
| IIA.  | On the Implement-bearing Deposits of Taungs and Tiger Kloof in the Cape Province of South Africa. Fig. 8, Characteristic types of hand-axes ... ..  | 416 |
| III.  | Survey of Village and Carved Rocks of Orongo, Easter Island, by the Mana Expedition. 1. Rano Kao from Islet of Motu Nui. 2. Crater of Rano Kao, Orongo on the right ... ..  | 450 |
| IV.   | Survey of Village and Carved Rocks of Orongo. 1. Excavation showing construction of back of houses. 2. (I) Two representations of an <i>ao</i> , or ceremonial paddle. (II) A face adorned with paint; a European ship ... ..                   | 450 |
| V.    | Survey of Village and Carved Rocks of Orongo. 1. Geological section, showing curved jointing in rock used as capstones of houses. 2. Capstones of houses in position ... ..   | 450 |
| VI.   | Survey of Village and Carved Rocks of Orongo. 1. End of a house unroofed. 2. Entrance of passage unroofed ... ..  | 450 |
| VII.  | Survey of Village and Carved Rocks of Orongo. 1. A broken doorway, small pit, and carved stone. 2. Stone carved with face. 3. A small pit ... ..  | 450 |
| VIII. | Survey of Village and Carved Rocks of Orongo. 1. Central houses of village. 2. Door-post, formerly a foundation stone, carved with face ... ..  | 450 |
| IX.   | Survey of Village and Carved Rocks of Orongo. 1. Statue from Orongo (front). 2. Ditto (back) ... ..   | 450 |
| X.    | Survey of Village and Carved Rocks of Orongo. 1. House No. 11, which contained the statue. 2. House No. 18, with circular stone, probably a pedestal ... ..   | 450 |



## PLATES

To face page

|         |   |   |     |
|---------|---|---|-----|
| XI.     | Survey of Village and Carved Rocks of Orongo. | 1. Doorways of houses<br>Nos. 26 and 27. 2. House No. 33 ... ..   | 450 |
| XII.    | Survey of Village and Carved Rocks of Orongo. | 1. Western group of<br>rocks, western aspect. 2. Face carved on western rocks, 1' 4" ×<br>1' 6" ... ..  | 450 |
| XIII.   | Survey of Village and Carved Rocks of Orongo. | Houses Nos. 40 to 44,<br>and carved rocks ... ..  | 450 |
| XIII A. | Survey of Village and Carved Rocks of Orongo. | 1. Houses, Nos. 40<br>to 43. 2. Western group of rocks, eastern aspect ... ..   | 450 |
| XIV.    | Survey of Village and Carved Rocks of Orongo. | 1. Stone carved with<br>three bird-men, 6' 0" × 4' 0", western group. 2. Carvings of two<br>bird-men and a face... ..   | 450 |
| XV.     | Survey of Village and Carved Rocks of Orongo. | 1. Bird-man holding<br>egg. 2. Geological section of the cliff of which the top is the carved<br>horizontal stones. 3. Bird-man with crooked beak, height 4' 4"; on<br>left, hands holding an egg... .. | 450 |
| XVI.    | Survey of Village and Carved Rocks of Orongo. | 1. Door-post between<br>No. 41 and 42. 2. "Fan" carving on stone between Nos. 43 and 44.<br>3. Portion of a pillow stone carved with <i>ko mari</i> figures ... ..                                      | 450 |
| XVII.   | Survey of Village and Carved Rocks of Orongo. | 1. Carvings from<br>Orongo. 2. Carvings from Motu Nui ... ..  | 450 |

## FIGURES IN THE TEXT.

|   | PAGE |
|---|------|
| Distribution of Indonesian outriggers ... ..  | 71   |
| Model of a war vessel, <i>knabat bogolu</i> , Mentawai Islands (after Rosenberg, 1888)<br>(Fig. 1) ... ..   | 74   |
| Sections of models of canoes: (A) Sulu; (B) Moro canoe, Zamboanga; (C) Moro<br>canoe, Zebu; (D) Sangir (from Müller, 1912, Figs. 55, 56, 57, 58)<br>(Fig. 2) ... ..                                 | 74   |
| Model of a sailing ship, with tripod mast, straight booms and boom spars and a<br>U-Moluccan attachment, Wetta (from Baessler) (Fig. 3) ... ..  | 75   |
| Model with a boom spar and Halmaheran attachment, Tenimber (Leiden) (Fig. 4)  | 75   |
| Model of canoe with a direct lashed attachment and an outlayer, Sangir, Talaut<br>Islands (Amsterdam) (Fig. 5) ... ..   | 77   |
| Canoe with double outrigger, four booms, and Halmaheran attachment, Weda<br>Bay, Halmahera (Fig. 6) ... ..  | 80   |
| Canoe with double outrigger, three booms, and direct lashed attachment, Sulu<br>(Fig. 7) ... ..   | 80   |
| Pirate craft off North Point of Borneo (after Pritchett) (Fig. 8) ... ..  | 81   |
| Model with double outrigger and mixed direct attachment, Java (Amsterdam)<br>(Fig. 9) ... ..  | 84   |
| Stick attachments, Nicobars: A-C, D, E, Models (Oxford); F, Model (Edinburgh)<br>(Fig. 10) ... ..   | 85   |
| Stick attachments, Andamans: A, B, Great Andaman; C, Little Andaman;<br>D, Model (Cambridge); E, Model (British Museum) (Fig. 11) ... ..  | 86   |
| "Coracora A," the double outrigger has a float consisting of two planks; B, "The<br>Karkolla of the King of Ternate," with a Y-Board attachment; above this<br>is a Madura warship (Fig. 12) ... .. | 87   |
| "De Cora-Cora Van Titaway" (Fig. 13) ... ..   | 88   |
| Balinese attachment: A, Bali; B, Model from Banjuwangi, E. Java (Fig. 14) ...   | 88   |
| Moluccan attachments: A, Batjan; B, Amboina; C, Banda (Fig. 15) ... ..  | 89   |
| Halmaheran attachments: A, Buton; B, C, Akke Selaka, and D, Weda Bay,<br>Halmahera; E, Model from Talaut; F, Batchan (Fig. 16) ... ..   | 90   |
| Canoe with double outrigger, Halmaheran attachment, and an inner and an<br>outer longitudinal spar, Batjan (Fig. 17) ... ..   | 90   |
| Fishing boat, <i>sukung</i> , with mixed direct and rod attachment, Probolinggo, Madura<br>Strait (Fig. 18) ... ..  | 93   |
| Model of a <i>sekong</i> , with mixed direct and rod attachment, Pasuran, E. Java (Fig. 19)   | 93   |



|   | PAGE |
|---|------|
| Sketch of a mixed direct and rod attachment, Madura (Fig. 20) ... ..  | 94   |
| Sketch of a mixed direct and rod attachment, Bawean Islands (Fig. 21) ... ..  | 94   |
| Sailing canoe, <i>londi</i> , with mixed direct and Halmaheran attachment, Talisse Island, N.E. Celebes (Fig. 22) ... ..  | 95   |
| Mixed rod and Halmaheran attachment, Kema, N.E. Celebes (Fig. 23) ... ..  | 96   |
| Indo-Javanese ship: double float (Fig. 24) ... ..   | 101  |
| Indo-Javanese ships (Figs. 25 and 26) ... ..  | 102  |
| Indo-Javanese ships (Figs. 27 and 28) ... ..  | 103  |
| Sketch from a photograph of a model of a canoe with three curved booms with a direct lashed attachment and two straight booms, Nonuti, Gilbert Group (Fig. 29) ... .. | 105  |
| Model of a canoe with a double outrigger and one boom, Pasig River, Manila (Fig. 30) ... ..   | 115  |
| Same as Fig. 30, seen from above and without the awning (Fig. 31) ... ..  | 115  |
| Toy canoes, <i>jong</i> , of Malanau and Malay children, Sarawak (Fig. 32) ... ..   | 116  |
| Attachments of canoes, Funafuti, Ellice Islands (Fig. 33) ... ..  | 124  |
| Attachment of a canoe, <i>ekuo</i> , Nauru, Micronesia (Fig. 34) ... ..   | 128  |
| Three views of <i>pointe</i> from Chalky Boulder Clay, Pit No. 1, $\times \frac{2}{3}$ (Figs. 1, 1A, 1B) ...  | 143  |
| Three views of <i>pointe</i> from Chalky Boulder Clay, Pit No. 2, $\times \frac{2}{3}$ (Figs. 2, 2A, 2B)...   | 143  |
| Three views of <i>racloir</i> from Chalky Boulder Clay, Pit No. 2, $\times \frac{2}{3}$ (Figs. 3, 3A, 3B)...  | 144  |
| Three views of <i>racloir</i> from Chalky Boulder Clay, Pit No. 1, $\times \frac{2}{3}$ (Figs. 4, 4A, 4B)...  | 145  |
| Three views of scraper of ordinary type from Chalky Boulder Clay, Pit No. 2, $\times \frac{2}{3}$ (Figs. 5, 5A, 5B) ... ..  | 146  |
| Four views of scraper of ordinary type from Chalky Boulder Clay, Pit No. 3, $\times \frac{2}{3}$ (Figs. 6, 6A, 6B, 6C)...   | 147  |
| Three views of platessiform implement from Chalky Boulder Clay, Pit No. 2, $\times \frac{2}{3}$ (Fig. 7, 7A, 7B) ... ..   | 148  |
| Three views of flake from Chalky Boulder Clay, Pit No. 2, $\times \frac{2}{3}$ (Figs. 8, 8A, 8B) ...  | 148  |
| Two views of flake from Chalky Boulder Clay, Pit No. 2, $\times \frac{2}{3}$ (Figs. 9 and 9A) ...   | 149  |
| Two views of ancient ochreous flake with later edge-flaking from the Chalky Boulder Clay, Pit No. 2, $\times \frac{2}{3}$ (Figs. 10 and 10A) ... ..                   | 150  |
| Flake implement from Chalky Boulder Clay, Pit No. 3, $\times \frac{2}{3}$ (Figs. 11, 11A, 11B)...   | 151  |
| Flake implement from Chalky Boulder Clay, Pit No. 2, $\times \frac{2}{3}$ (Figs. 12 and 12B) ...  | 152  |
| Flake implement from Chalky Boulder Clay, Pit No. 3, $\times \frac{2}{3}$ (Figs. 13 and 13B)...   | 152  |
| Chinese dove-chariot vase (Fig. 1) ... ..   | 153  |
| Socketed celts, $\times \frac{1}{2}$ (Figs. 2 and 3) ... ..   | 154  |
| European Bronze Age dove-chariot vase (Fig. 4) ... ..   | 155  |



|   | PAGE |
|---|------|
| Dove-chariot vase figured in the Pokutu (Fig. 5) ... ..   | 156  |
| Greek coin from Krannon (Fig. 6) ... ..   | 157  |
| Comparison of male and female colour indices (Fig. 1) ... ..  | 165  |
| Male and female indices arranged consecutively and independently of one another (Fig. 2) ... ..             | 167  |
| Colour index of England (Fig. 3) ... ..   | 170  |
| Colour index of Great Britain (Fig. 4) ... ..   | 171  |
| Fleure's chart of colour index (Fig. 5) ... ..  | 173  |
| Colour index of British Isles (military statistics) (Fig. 6) ... ..   | 176  |
| Colour indices of the United Kingdom (Fig. 7) ... ..  | 177  |
| Colour index of Ireland (males and females) (Fig. 8) ... ..   | 178  |
| Comparison of colour index in town and country (Fig. 9) ... ..  | 180  |
| Map I, British New Guinea ... .. <i>facing page</i>   | 276  |
| Map II, Diagram showing distribution of Papuans and Papuo-Melanesians in Southern British New Guinea ... .. | 277  |
| Map III, Sketch Map of New Guinea from the Gulf of Papua to Astrolabe Bay ...                               | 278  |
| Map IV, Sketch Map of the Sepik and Upper Fly ... ..  | 279  |
| Map V, Sketch Map of New Guinea from Redscar Bay to Mamba Bay ... ..  | 280  |
| Comparison of orbital contours of Tasmanian and Eskimo skull, $\times \frac{1}{2}$ (Fig. 1) ...             | 284  |
| Comparison of orbital contours of Neolithic and Modern English skulls, $\times \frac{1}{2}$ (Fig. 2)        | 285  |
| Orbital contours superimposed, using the nasion as a fixed point, $\times \frac{1}{2}$ (Fig. 3) ...         | 286  |
| Average contours of norma facialis, palate and mandible (Eskimo), $\times \frac{1}{4}$ (Fig. 4)...          | 286  |
| Average contours of norma verticalis and norma lateralis, $\times \frac{1}{4}$ (Fig. 5) ... ..              | 286  |
| Eskimo type contours, superimposed on modern English, $\times \frac{1}{4}$ (Fig. 6) ... ..                  | 287  |
| The Chancelade skull (after Testut), $\times \frac{1}{4}$ (Fig. 7) ... ..                                   | 289  |
| Papuan cat's cradles, The Crab (Fig. 1) ... ..  | 302  |
| The Snake (Fig. 2)... ..  | 302  |
| The Two Parrots (Fig. 3) ... ..   | 303  |
| Bololo'aku (Fig. 4) ... ..  | 303  |
| The Basket (Fig. 5) ... ..  | 304  |
| The Knee (Fig. 6) ... ..  | 304  |
| The Baby (Fig. 7) ... ..  | 305  |
| The Yam (Fig. 8) ... ..   | 305  |
| The Bald Man (Fig. 9) ... ..  | 306  |
| Matafwa'si (Fig. 10) ... ..   | 306  |

|   | PAGE |
|---|------|
| Number (?) (Fig. 11) ... ..   | 307  |
| The Sun and Moon (Fig. 12) ... ..                                     | 308  |
| A Ripe Chestnut (Fig. 13) ... ..                                      | 308  |
| The Brush Turkey (Fig. 14) ... ..                                     | 308  |
| The Seine (Figs. 15 and 16) ... ..                                    | 309  |
| The Pleiades (Fig. 17) ... ..   | 310  |
| The Pepper Plant (Fig. 18) ... ..                                     | 311  |
| Wasifobo'di (Fig. 19) ... ..  | 312  |
| The Crest of the Cockatoo (Fig. 20) ... ..                            | 313  |
| A Shell-fish (Fig. 21) ... ..   | 313  |
| The Ear Pendant (Fig. 22) ... ..                                      | 313  |
| Sisiafwa'tu (Fig. 23) ... ..  | 314  |
| Cutting the hand (Fig. 24) ... ..                                     | 314  |
| The String Bag (Fig. 25) ... ..                                       | 315  |
| A Hiss (?) (Fig. 26) ... ..   | 316  |
| A Gathering-in (?) (Fig. 27) ... ..                                   | 317  |
| The Kangaroo (Fig. 28) ... ..   | 318  |
| An Evil Spirit (Fig. 29) ... ..                                       | 318  |
| The Boar's Tusk Pendant (Fig. 30) ... ..                              | 319  |
| A Panpipe (Fig. 31) ... ..  | 319  |
| A House (Fig. 32) ... ..  | 320  |
| Kiloma'dumadu (Fig. 33) ... ..  | 320  |
| Fakale'a (Fig. 34) ... ..   | 321  |
| A Canoe (Fig. 35) ... ..  | 321  |
| A Paddle (Fig. 36) ... ..   | 322  |
| A Squirrel (Fig. 37) ... ..   | 323  |
| A Bad Pot (Fig. 38) ... ..  | 324  |
| The Bad Pot (Fig. 39) ... ..  | 324  |
| A Boat Sail (Fig. 40) ... ..  | 324  |
| The Sago Palm (Fig. 41) ... ..  | 324  |
| Map of the country south of Vryburg, Cape Province (Fig. 1) ... ..    | 413  |
| Section across spruit at Taungs, Cape Province (Fig. 2) ... ..        | 413  |
| Axe-shaped implement of diorite, $\times \frac{1}{3}$ (Fig. 3) ... .. | 414  |
| Quartzite hand-axe, $\times \frac{1}{3}$ (Fig. 4) ... ..              | 415  |
| Flake implement of diorite, $\times \frac{1}{3}$ (Fig. 5) ... ..      | 415  |

|  | PAGE               |
|--|--------------------|
| Quartzite hand-axe, $\times \frac{1}{3}$ (Fig. 6) ... ..                           | 416                |
| Quartzite hand-axe, $\times \frac{1}{3}$ (Fig. 7) ... ..                           | 416                |
| Waterworn flakes from pebble bed, $\times \frac{1}{3}$ (Fig. 9) ... ..             | 417                |
| Flake implements from pebble bed, $\times \frac{1}{3}$ (Fig. 10) ... ..            | 418                |
| Flake implements, $\times \frac{1}{3}$ (Fig. 11) ... ..                            | 418                |
| Section at Tiger Kloof (Fig. 12) ... ..  | 421                |
| Hand-axe, $\times \frac{1}{3}$ (Fig. 13) ... ..                                    | 421                |
| Hand-axes of shale, $\times \frac{1}{3}$ (Fig. 14) ... ..                          | 422                |
| Quartzite implement, $\times \frac{1}{3}$ (Fig. 15) ... ..                         | 422                |
| Scraper of chert, $\times \frac{1}{3}$ (Fig. 16) ... ..                            | 423                |
| Flakes, $\times \frac{1}{3}$ (Fig. 17) ... ..                                      | 423                |
| Bushman scrapers, $\times \frac{1}{3}$ (Fig. 18) ... ..                            | 423                |
| Map of Easter Island, physical (Fig. 1) ... ..                                     | 427                |
| Plan of the village of Orongo and of its carved rocks (Fig. 2) ... ..              | <i>To face</i> 429 |
| Plan and sections of a typical stone house, No. 22, at Orongo (Fig. 3) ... ..      | 429                |
| Vertical section of a house (Fig. 4) ... ..  | 429                |
| Plan of group of stone houses at Orongo (Fig. 5) ... ..                            | 435                |
| Ground plan of houses, Nos. 40 to 45, showing certain measurements (Fig. 6) ... .. | 446                |



JOURNAL  
OF THE  
ROYAL ANTHROPOLOGICAL INSTITUTE  
OF GREAT BRITAIN AND IRELAND.

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MINUTES OF THE ANNUAL GENERAL MEETING,  
TUESDAY, JANUARY 27TH, 1920, AT THE ROOMS OF THE INSTITUTE,  
50, GREAT RUSSELL STREET, W.C.

Sir EVERARD IM THURN, *President, in the Chair.*

The Minutes of the last Annual General Meeting were read and accepted.

The PRESIDENT appointed Mr. BARNARD and Mr. BRAUNHOLTZ as Scrutineers, and declared the ballot open.

The HONORARY SECRETARY read the Annual Report of the Council for 1919, and on the motion of the PRESIDENT, seconded by Mr. A. L. LEWIS, this was accepted.

In the absence of the TREASURER, his Report was read by the HONORARY SECRETARY, and on the motion of the PRESIDENT, seconded by Mr. A. L. LEWIS, this also was accepted.

The PRESIDENT then delivered his Address, "The Contact of Civilization with Savagery."

The SCRUTINEERS delivered their Report, and the following were declared to be duly elected as Officers and Council for 1920-21.

*President.*—Sir Everard F. im Thurn, K.C.M.G., K.B.E., C.B.

*Vice-Presidents.*

M. Longworth Dames.  
S. H. Ray, M.A.

Prof. F. G. Parsons, F.R.C.S.

*Hon. Secretary.*—E. N. Fallaize, B.A.

*Hon. Treasurer.*—R. W. Williamson, M.Sc.

*Council.*

H. C. Beasley.  
Col. S. L. Cummins, R.A.M.C.  
Miss M. E. Durham.  
H. J. Fleure, D.Sc.  
Sir J. G. Frazer, D.C.L., LL.D., Litt.D.  
Capt. A. W. F. Fuller.  
H. S. Harrison, D.Sc.  
Capt. T. A. Joyce, M.A., O.B.E.  
H. G. A. Leveson, M.R.A.S., F.R.G.S.  
A. L. Lewis, F.C.A.  
C. S. Myers, M.A., M.D.

E. A. Parkyn, M.A.  
H. J. E. Peake.  
W. P. Pycraft, A.L.S.  
Carveth Read, M.A.  
W. H. R. Rivers, M.A., M.D., F.R.S.  
Prof. C. G. Seligman, M.D.  
H. S. Stannus, M.D.  
Lt.-Col. L. A. Waddell, C.B., C.I.E.,  
LL.D.  
Prof. W. Wright, M.B., D.Sc., F.R.C.S.,  
F.S.A.

A hearty vote of thanks to the PRESIDENT for his interesting Address was proposed by Mr. SEFTON JONES, and carried by acclamation.

# REPORT OF THE COUNCIL FOR THE YEAR 1919.

THE first complete year after the termination of hostilities in the war has afforded indications that the Institute has passed successfully through the long and difficult period which began in 1914. The increase in the number of Fellows elected, the greater number of Meetings held, the increased sale of publications, and the improved financial position shown by the Treasurer in his Report, give ground for the hope that the Institute is entering on a period of renewed activity and greater prosperity. Since by far the greater part of the income of the Institute is derived from the subscriptions of its Fellows, and since a substantial increase in the number of these is the only means by which the Institute can hope to effect improvements in its publications, its Library, and its accommodation, the Council hopes that Fellows will take every opportunity of adding to their number by their individual efforts. The scope and aims of the Institute, and the advantages it offers to Fellows, are probably unknown to many persons who are interested in some branch of Anthropology, whilst others may be deterred from seeking to join by the assumption that learned societies welcome only the learned.



Whilst the Council feels that there is ground for optimism, it must still be recognized that, in maintaining the rate of subscription of Fellows and the prices of the Institute's publications, at their pre-war level, the strain on the finances of the Institute is such as to dictate a continued policy of economy. The high costs of publication, the increased prices for books and binding, and the continued rise in office expenses, are factors which have to be taken into account in all schemes involving expenditure.

With few exceptions, the Meetings during the year have been held in the rooms of the Institute. For two of the Meetings an excellent lecture-hall in Burlington House was secured, but it was, unfortunately, not possible to obtain the use of this on other occasions. The Council has endeavoured to arrange for the use of a suitable room, at such times as may be convenient and desirable, but up to the present without success. The efforts made to secure improved accommodation for the Institute as a whole are referred to in another part of this Report (*see below*).

The first part of the *Journal* issued during the year was, as foreshadowed in the last Report of the Council, of considerably reduced size. The second part issued was larger, though not equal to what may be regarded as normal size. The Council regards the action taken in reducing the *Journal* as fully justified by the outlook at the time, though they recognize the necessity of restoring it to its full size as soon as circumstances permit. Some at least of this restoration will be effected in 1920, as the Council can, if needful, utilize some of the surplus of the year 1919.

As will be seen from the following table, there has been a reduction of 1 in the number of Honorary Fellows, of 2 Compounding Fellows, and of 1 Affiliated Member. On the other hand, the number of Subscribing Fellows has been increased by 18, and Local Correspondents by 3.

|                                     | Total<br>Jan. 1st, 1919. | Loss by death<br>or resignation. | Since<br>elected. | Total<br>Jan. 1st, 1920 |
|-------------------------------------|--------------------------|----------------------------------|-------------------|-------------------------|
| Honorary Fellows ... ..             | 40                       | 3                                | 2                 | 9                       |
| Local Correspondents ... ..         | 18                       |                                  |                   | 20                      |
| <i>Deduct also Ordinary Fellows</i> | 3                        | 1                                | 3                 | 2                       |
|                                     | — 15                     |                                  |                   | — 18                    |
| Affiliated Societies ... ..         | 3                        | —                                | —                 | 3                       |
| Affiliated Members ... ..           | 1                        | 1                                | —                 | —                       |
| Ordinary Fellows:—                  |                          |                                  |                   |                         |
| Compounding ... ..                  | 65                       | 2                                | —                 | 63                      |
| Subscribing ... ..                  | 379                      | 17                               | 35                | 397                     |
| Total Membership ... ..             | 503                      |                                  |                   | 520                     |

The Honorary Fellows elected were M. l'Abbé Breuil and Prof. Zammit.

The losses which the Institute has suffered by death are the following :—F. du Cane Godman (elected 1879), Sir E. C. Stirling (elected 1894, Obituary Notice appeared in *Man*, 1919, 45), Mr. W. A. Backhouse (elected 1895), Dr. R. C. Maclagan (elected 1899), Professor Alexander Macalister (elected 1884, Obituary Notice appeared in *Man*, 1919, 85), Dr. F. Moreno (elected 1900), G. Muir Laidlaw (elected 1914), Professor Gustav Retzius (elected 1902, Obituary Notice appeared in *Man*, 1919, 79), Major C. H. Stigand (elected 1911), Dr. A. P. Young (elected 1906).

#### MEETINGS.

The number of Ordinary Meetings held was ten, as compared with three in 1918, and six in 1917. Twelve papers were read, of which seven were on ethnological and five on archæological subjects. Exhibits of specimens were made at several of the Meetings. As for several years past a Joint Meeting was held with the Pre-historic Society of East Anglia, at which the President of this Society delivered his Annual Address, and a paper was read by a Fellow of the Institute.

#### PUBLICATIONS.

During the year two half-yearly parts of the *Journal* have been issued, viz., Vol. xlviii, Part 2, and Vol. xlix, Part 1. Of the former 91 copies and of the latter 101 copies have been sold. These figures compare favourably with those for 1918 (94 and 69 respectively), since they represent an increase of 28 copies sold. The usual twelve monthly parts of *Man* have been issued, and a very gratifying increase in the Office Sales of this publication has to be recorded; these have been over two-and-a-half times the sales for 1918. There has also been a slight increase in the amount received from subscriptions to *Man*.

#### LIBRARY.

The accessions to the Library number 214, of which 29 are bound volumes. The exchange list has been increased by two publications. During the year the Acting Assistant Secretary completed a new card catalogue of the Library (author index), which has proved itself to be much more serviceable than the old catalogue on paper slips.

With a view to improving the condition of the Library, and increasing its usefulness to Fellows, the Council has appointed a special Committee to advise as to its reorganization and extension. Some preliminary work has been done, and the catalogue slips relating to various sections have been placed in the hands of Fellows qualified to make recommendations as to the directions in which extensions are desirable.



INTERNAL.

*Housing.*

During the year the Council has given careful consideration to the important question of better accommodation for the Institute. The co-operation of other Societies was sought, and a Joint Committee formed to discuss plans and, if possible, find premises capable of housing some, or all, of the societies interested. The Asiatic Society, which was in need of premises for early occupation, found quarters which were suitable and would allow space for some of the smaller societies, but these premises offered no advantages to the Institute. Other suggested premises have been inspected by Officers and Fellows of the Institute, but at the close of the year the Council had decided that the difficulties and expense of securing better accommodation at the present time were such as to emphasize the need for a policy of caution.

APPOINTMENT OF RESEARCH COMMITTEES.

With a view to furthering Anthropological investigation, the Council has initiated the policy of forming Research Committees, the members of which are selected in the first instance from amongst the Fellows of the Institute. Up to the present two such Committees have been appointed, one to study the classification and distribution of megaliths, and the other for the investigation of the stone-axe factory at Penmaenmawr, and questions arising out of the discovery. The Institute is not responsible for any expenses incurred by the Committees, but application for grants for specific purposes may be made to the Council, and in one case a small grant has already been made.

EXTERNAL.

Professor Keith and Dr. W. H. R. Rivers acted as the Council's representatives on the Conjoint Board of Scientific Societies. No contribution was made to the funds of the Board during 1919.

HONOURS CONFERRED ON FELLOWS OF THE INSTITUTE.

The Council desires to offer its congratulations to Professor Sir William Ridgeway and Professor Sir W. Boyd Dawkins, upon whom has been conferred the honour of Knighthood, and to Professor C. G. Seligman, who has been elected a Fellow of the Royal Society.

TREASURER'S REPORT FOR THE YEAR 1919.

The revenue for the year 1919 has exceeded its expenditure by £242 2s. 7d. The result of the year's working has therefore been better financially than that of 1918, when there was a deficit of £62 8s. 1d., by £304 10s. 8d.

The following are the most prominent or interesting items in respect of which the difference between the two years has arisen, shillings and pence being omitted from the figures :—

| <i>Improvements in 1919—</i>   |     |     |     |      | £   | £    |
|--|-----|-----|-----|------|-----|------|
| Subscriptions received in 1919   | ... | ... | ... | ...  | 836 |      |
| do. do. 1918 (including a life subscription)                           |     |     |     |      | 783 |      |
|  |     |     |     |      |     | 53   |
| Net cost of <i>Journal</i> in 1918 : gross cost, £345 ; proceeds, £145 |     |     |     |      | 200 |      |
| do. do. 1919 : do. £298 ; do. £202                                     |     |     |     |      | 96  |      |
|  |     |     |     |      |     | 104  |
| Dividends and interest received in 1919                                | ... |     |     | £105 |     |      |
| do. do. (American Bonds)   |     |     |     | 34   |     |      |
|  |     |     |     |      | 139 |      |
| do. do. in 1918  | ... | ... | ... | ...  | 75  | 64   |
| Income Tax for three years returned in 1919                            | ... | ... | ... | ...  |     | 46   |
| Aircraft Insurance paid in 1918, but not in 1919                       | ... | ... | ... | ...  |     | 12   |
| Library expenses in 1918   | ... | ... | ... | ...  | 35  |      |
| do. do. 1919   | ... | ... | ... | ...  | 9   |      |
|  |     |     |     |      |     | 26   |
|  |     |     |     |      |     | 305  |
| <i>Deduct—</i>   |     |     |     |      |     |      |
| Net cost of <i>Man</i> in 1919 : gross cost, £311 ; proceeds, £219     |     |     |     |      | 92  |      |
| do. do. 1918 : do. £239 ; do. £154                                     |     |     |     |      | 85  |      |
|  |     |     |     |      |     | 7    |
|  |     |     |     |      |     | £298 |

As regards some of these figures, I may say that we received in 1919 £33 more in respect of arrears of subscriptions than in 1918 ; but this is an improvement the continuance of which cannot be assumed. The amount of arrears accumulated during the war, and still owing, is, however, very heavy, and I trust that Fellows by whom they are owing will clear them off, if they can do so. The improvement in dividends and interest received will, I hope, continue ; the portion of it arising from sources other than the American bonds is due mainly to the fact that in 1919 the Institute received the full benefit of its Government war investments.

A question which will occur to many Fellows on comparing the accounts for the two years 1918 and 1919 is, Why did the Council in 1919, with a largely increased revenue, spend £47 less on the two half-yearly numbers of the *Journal* issued in that year than on those of the previous year ? There are two answers to this question. The Council was, in the latter part of 1918, told by the printers that an extremely heavy additional increase in the cost of printing, as compared with pre-war charges, would have to be made, and it was compelled to reduce the size of the *Journal* in order to meet this. When, however, in the autumn of 1919, the bills came in, the increase over pre-war charges was found to be only about three-fifths of the anticipated amount. If the increase had been in accord with the warning given in 1918, the cost of the *Journal* (including authors' copies) would have been about £75 more than it proved to be. Then, again, the Council had no ground in the autumn of 1918, when the size of the half-yearly number to be published in the beginning of 1919 had to



be arranged, for relying upon any increase for 1919 in the amount to be received from subscriptions, and sales of *Journals* and *Man*; and even in the spring of 1919 there was no ground for assuming any substantial increase, as the bulk of the improvement did not show itself till later in the year.

In the present year (1920) there will, it is feared, be some financial set-backs. The cost of printing is to be raised again; the rent of the Institute's premises will be increased by £25; and there are other unavoidable increases of expenditure in prospect, and may be still others of which no indications have yet appeared. Peace has now, at last, been ratified and declared; but, nevertheless, almost everything affecting the year's finances is quite uncertain, and the Council will have to continue a policy of caution.

ROBERT W. WILLIAMSON,  
*Hon. Treasurer.*





# OF GREAT BRITAIN AND IRELAND.

THE YEAR 1919.

## ACCOUNT.

|                                     | RECEIPTS. | £ s. d. | £ s. d.  |
|-------------------------------------|-----------|---------|----------|
| BALANCE, 1st January, 1919 .....    |           |         | 256 3 6  |
| SUBSCRIPTIONS :—                    |           |         |          |
| Current .....                       | 709 15 0  |         |          |
| Arrears .....                       | 85 11 10  |         |          |
| Advance .....                       | 40 18 0   |         |          |
|                                     |           |         | 836 4 10 |
| SALE OF "JOURNAL" .....             |           |         | 202 14 0 |
| SALE OF "MAN" .....                 |           |         | 219 2 6  |
| SALE OF "HUXLEY LECTURE" .....      |           |         | 1 19 0   |
| ADVERTISING .....                   |           |         | 0 16 10  |
| DIVIDENDS .....                     | 105 15 1  |         |          |
| do. (AMERICAN DOLLAR BONDS) .....   | 34 3 3    |         |          |
|                                     |           |         | 139 18 4 |
| INCOME TAX RETURNED (3 years) ..... |           |         | 46 4 2   |
| SALE OF WASTE PAPER .....           |           |         | 0 9 11   |
| SUNDRIES .....                      |           |         | 0 5 9    |

£1,703 18 10

## ACCOUNT.

|                                     | £ s. d.      |
|-------------------------------------|--------------|
| TRANSFER FROM REVENUE ACCOUNT ..... | <u>9 3 9</u> |





|                               |     |   |   |
|-------------------------------|-----|---|---|
| Cash :                        |     |   |   |
| In Bank—                      |     |   |   |
| Deposit Account .....         | 200 | 0 | 0 |
| Current Account .....         | £83 | 2 | 0 |
| Less Outstanding cheque ..... | 1   | 0 | 0 |
|                               | 82  | 2 | 0 |
| In hand (petty cash) .....    | 282 | 2 | 0 |
|                               | 0   | 5 | 9 |
|                               | 282 | 7 | 9 |

£5,984 13 8

£5,984 13 8

ROBERT W. WILLIAMSON, *Hon. Treasurer.*

We have examined the Accounts of the Royal Anthropological Institute and have obtained all the information and explanations we have required. In our opinion the Balance Sheet at 31st December, 1919, is properly drawn up so as to exhibit a true and correct view of the state of the Institute's affairs according to the best of our information, and as shown by the books of the Institute.

58, Coleman Street, E.C.  
27th January, 1920.

JACKSON, PIXLEY, BROWNING, HUSEY & CO., CHARTERED ACCOUNTANTS,  
*Auditors.*

## SOME EARLY NEANTHROPIC TYPES IN EUROPE AND THEIR MODERN REPRESENTATIVES.

By H. J. FLEURE.

THE progress of anthropometrical survey in Wales has revealed marked local differences in the constitution of the population, in spite of the fact that every locality possesses several types living side by side, making study by methods of averaging comparatively valueless. Frequently a locality has an unusually high percentage of persons with some fairly definite group of associated characters, and the present paper deals with progress of the study of hyperdolichocephaly and certain features occurring with it, features found, for example, in a number of persons belonging by descent on both sides to the Plynlymon region.

Table 1 shows that in Plynlymon the percentage of people with index under 73 is very high and that the same is true for people with index under 74. Plynlymon has also a slightly supernormal percentage of people with indices from 74.0 to 74.9 inclusive, but this last excess is almost negligible. It may be added that the Plynlymon moorland is markedly below the average as regards numbers of persons of high cephalic index.

The following list will help to bring out other characters typically linked with the hyperdolichocephaly just found to be so characteristic of Plynlymon. The cases are taken from the moorland proper, where the characters occur in even more marked fashion than on the fringes.

1. J.J. Hair dark brown, wavy, eye dark brown, face rather long, frontal breadth small, glabella and supraciliaries strong, forehead receding, head contour oblong. Max. head length 214 mm., max. head breadth 152, ceph. index 71.0, horiz. circum. of head 605, bizygomatic 142, auriculo-nasal radius 95, auriculo-alveolar radius 97, stature 1675, age 60. (*See photo, Journ. Roy. Anthropol. Inst.*, xlvii, 1916, pl. 1.)

2. J.J. Hair dark brown, wavy, eye medium brown, skin rather dark but with florid tendency, forehead narrow and rather receding. Measurements (in above order), 208, 149, 71.6, 588, 136, —, —, 1771, 25.



3. B.T. Hair dark brown, wavy, eye very dark, skin fresh, face long, glabella and supraciliaries uniquely strong, forehead receding. Measurements, 203, 148, 72·9, 560, 135, 87, 89, 1690, adult.

4. W.T. (brother of 3). Hair black, eye brown, skin fresh, face long, glabella and supraciliaries strong, forehead retreating. Measurements, 206, 149, 72·3, 570, 130, 97, 100, 1685, 40, adult.

5. T.H.E. Hair very dark brown, eye grey-brown, skin fresh, florid, broad nose, strong glabella and supraciliaries, deep nasion, forehead retreating. Measurements, 200, 148, 74·0, 568, 128, 78, 84, 1650, adult.

6. W.J. Hair black, wavy, eye brown, skin pale, face long, glabella and supraciliaries strong, forehead receding, occiput very prominent. Measurements, 201, 147, 73·1, —, 139, —, —, 1740, adult.

7. D.S. Hair black, eye dark brown, skin fresh, face rather long, head contour long oval. Measurements, 194, 130, 67·0, 550, 122, 97, 99, 1600, adult.

8. I.M. Hair dark brown, eye brown, skin dark, face long, head contour oval. Measurements, 202, 147, 72·8, 585, 140, 104, 107, 1665, adult.

It will be useful to give a few other examples of this association of characters from other Welsh districts:—

9. E., Llangwryfon. This person might almost be included in the list from the Plynlymon district, as Llangwryfon is on a fairly high south-westward projection from the southern part of the Plynlymon moorland. Hair black, eye dark brown, skin dark, face long, ear with Darwin's point well marked. Measurements, 207, 151, 72·9, 575, 138, 97, 100, 1,739, adult.

10. T.T., Lampeter. The moorland is continued southward without important break, and Lampeter is a town below its western flank, so this person again comes from near the region under discussion. Hair almost black, eye brown, skin dark, face long. Measurements, 212, 158, 73·5, 605, 142, 114, 115, 1725, 21.

11. G., Moylgrove (off the north-western slope of Prescelly, south of Cardigan town). Hair black, eye almost black, skin fresh, face fairly long, head contour oblong. Measurements, 202, 149, 73·8, 550, 136, 98, 99, 1780, adult.

12. H.J. Several districts of Cardiganshire. Hair dark brown, eye brown, skin pale. Measurements, 212, 156, 73·6, 605, 147, 96, 97, 1720, adult.

13. J.J. (Clwydian Hills). Hair dark brown, eye brown, skin fresh, face long, nose short and broad. Measurements, 202, 148, 73·3, 585, 135, 100, 105, 1720, 64.

The above all have the auriculo-alveolar radius greater than the auriculo-nasal radius. The following do not show that prognathism, but are otherwise in close agreement with the above. Nos. 14–17 belong to the Plynlymon district.

14. M.E. Hair medium brown, eye brown, skin dark. Measurements, 202, 145, 71·8, 590, 134, 93, 91, 1,730, 41.

15. J.J. Hair almost black, eye brown, skin dark, forehead narrow, head contour long oval. Measurements, 206, 151, 73·3, 585, 139, 108, 106, 1610, 65.

16. F.D. Hair dark brown, eye brown, skin dark, face long. Measurements, 205, 145, 70·7, 587, 132, 105, 102, 1675, 27.

17. T.E. Hair dark brown, eye dark brown, skin dark. Measurements, 196, 142, 72·4, 555, 130, 96, 94, 1783, adult.

To these may be added the following from other districts. They show departures from the associated characters in details stated :—

18. M., Llanrhystyd (near Llangwryfon, *see* note under No. 9), is not quite dark enough for the type ; the hair is rather dark brown, eye brown, skin fresh. Measurements, 212, 148, 69·8, 573, 136, 93, 95, 1775, 45.

19. D. (Cardigan). Hair dark brown, eye brown, skin dark, face long and narrow, head contour long oval. Measurements, 203, 147, 72·4, 545, 126, 95, 93 (*i.e.*, this person is opisthognathous), 1690, age 16.

20. J.J. (Llandyssul). Hair almost black, eye brown, skin fresh, head contour long oval. This individual is rather too short in head measurements and is opisthognathous. Measurements, 197, 143, 72·6, 565, 141, 100, 93, 1680, 50.

21. G. (Moylgrove, *see* note under No. 11). Hair medium brown, eye dark brown, skin dark, face long, head contour long oval. Measurements, 205, 145, 70·7, 134, 104, 103 (*i.e.*, this person is opisthognathous), 1730, 19.

22. D.E. (Newcastle Emlyn) is opisthognathous. Hair very dark, eye brown, skin fresh. Measurements, 201, 148, 73·6, 565, 141, 96, 94, 1660, adult.

TABLE 1.

| District to which cases belong by descent on both sides.<br>Men only. | Cases No. | Ceph. Index under 73 |           | Ceph. Index under 74 |           |
|---|-----------|----------------------|-----------|----------------------|-----------|
|   |           | No.                  | Per cent. | No.                  | Per cent. |
| Plynlymon and its borders   | 273       | 18                   | 6·6       | 18+15                | 6·6+5·5   |
| Remainder of Wales ...  | 1579      | 33                   | 2·1       | 33+45                | 2·1+2·8   |
| Total (Wales) ...   | 1852      | 51                   | 2·7       | 51+60                | 2·7+3·2   |

|                           |      | Ceph. Index under 75 |           | Ceph. Index under 76 |           |
|---------------------------|------|----------------------|-----------|----------------------|-----------|
|                           |      | No.                  | Per cent. | No.                  | Per cent. |
| Plynlymon and its borders | 273  | 33+20                | 12·1+7·3  | 53+20                | 19·4+7·3  |
| Remainder of Wales ...    | 1579 | 78+115               | 4·9+7·3   | 193+187              | 12·2+11·9 |
| Total (Wales) ...         | 1852 | 111+135              | 5·9+7·3   | 246+207              | 13·2+11·2 |



The previous paper (*op. cit.*) gave some details of a much larger number of cases, but the above twelve (Nos. 1-8 and 14-17) show a number of characters in common, and belong by ancestry on both sides to the heart of this very sparsely peopled moorland.

We may now add to the above characters and give a description of the associated features which are so numerous as almost to constitute a distinct racial type:—

Absolute head length great (typically over 200 on the head); this length due partly to strength of glabella and partly to marked and rather low occipital prominence. Cephalic index usually well below 74 on the living head and sometimes below 70. The sagittal line on the skull stands out and has a marked down slope on either side, and the height of the head is a marked feature in spite of the apparently low and receding forehead, the characters of which are accentuated by the great development of the supraciliary arcs and the glabella; this head form is described as *hypsistenocephalic*. A sulcus is well marked over the supraciliary arcs, but not over the glabella. The forehead is narrow with well-marked lateral orbito-temporal depressions. The orbit is rather long and low, and this is linked with the rather large bizygomatic breadth.

The nose is rather broad, and there is usually some degree of alveolar prognathism; the palate is horseshoe-shaped rather than V-shaped in cross-section. The chin may be weak. The stature is usually not very great. The arm is rather long in proportion to the leg. The nails rarely have lunulae. Hair, eyes, and skin are often all dark with, frequently, a florid tendency in the complexion. Most have wavy hair, but a very few have been traced with curly hair and marked prognathism and small size, and sometimes the horseshoe palate and very strong white teeth.

Hairiness is sometimes very marked, and there may be an unusual amount of body- and neck-hair, even in women.

At the end of this description it is necessary to mention an error of terminology in my earlier paper<sup>1</sup> and to thank Giuffrida-Ruggeri for pointing it out.<sup>2</sup> In that paper the term *platycephaly* was wrongly used for individuals with moderately retreating foreheads. As a matter of fact these people seem to have a high head, but measurements are not quoted because they are not satisfactory when taken on the living head. In the description in the present paper the better term, "*hypsistenocephaly*," derived from Barnard Davis and applied by Giuffrida-Ruggeri, has been used.

That the above-mentioned facts regarding people in the Plynllymon district are true not only for the present generation but also for previous ones, is brought out by the following information:—

Certain photographs of two Nonconformist ministers, taken about 1860-70, were shown to Sir John Rhys. They were selected because of the physical type

<sup>1</sup> *Journ. Roy. Anthropol. Inst.*, xlvii, 1916, p. 61, p. 69, etc.

<sup>2</sup> Giuffrida-Ruggeri, V., "Antropologia e Archeologia," *Arch. per l'Antr. e la Etn.*, vol. xlvii, 1916, p. 14.



indicated, and he stated that he knew the gentlemen in question and that they belonged to Plynlymon district. Professor R. H. Richards, of St. David's College, Lampeter, has kindly sent other photographs of these ministers and their relatives, and also data concerning them. One had marked curly hair, a small head, decided prognathism, and extremely dark colouring. The supraciliaries were strong, and the lateral orbito-temporal depression was strongly marked. One of his brothers showed the same type in all essentials, i.e., they were of the somewhat more "Africanoid" variety discussed below (see pp. 28-29). Another brother was more like the people in the list above, with strong supraciliaries and rather less closely curly hair. (See photographs in previous paper.<sup>1</sup>)

Mr. J. C. Symons<sup>2</sup> (1854) quotes a description of a man with dark rather lank hair, a very ruddy skin, receding brow, projecting teeth and, he adds, limited intelligence.

This author was not concerned with the anthropological origins of these peoples, but believed them to be descendants of the Red Robbers of Mawddwy (Gwylltiaid Cochion Mawddwy), who were expelled from their old home in the sixteenth century, and took refuge in Plynlymon district. Professor E. A. Lewis (Aberystwyth) kindly tells me that this dark type, with very ruddy cheeks, was pictured as the type of the Red Robbers on the jugs formerly in vogue around Llanidloes. The possibility of the relationship of these people to the Gwylltiaid Cochion is an interesting one; Mawddwy is another remote fastness of the mountains not many miles away from Plynlymon.

We may next notice finds analogous to those here described.

Da Costa Ferreira<sup>3</sup> shows that in the remote province of Tras-os-Montes in the mountains of North Portugal there are many people with very long heads and broad noses, and these characters are not found to any extent in the plains. The cephalic index averages about 72.4 and the nasal index 53.7 on the skull. These people are dark in colouring, prognathous, broad-nosed, hyperdolichocephalic and hypsistenocephalic, and Giuffrida-Ruggeri (*op. cit.*) believes them to be Africanoid in origin.

Telesforo de Aranzadi<sup>4</sup> found that 24 male skulls examined by him in the district of Guipuzcoa, south-west of the western end of the Pyrenees, had an average cephalic index between 76 and 77, but among them were indices down to 71.2. The very narrow heads are said to approach the Combe Capelle type. Apparently the height of the skull is occasionally greater than the maximum breadth, the nose broad and the orbit elongated, but the measurements are given in a way that makes it difficult to use them. There is at any rate the opinion that a type approaching that of the Combe Capelle man is found in Spain, but not among the Basques.

<sup>1</sup> *Journ. Roy. Anthropol. Inst.*, xlii, 1916, pls. 1 and 4.

<sup>2</sup> Symons, J. C., "Permanence of Races," *Archæologia Cambrensis*, 1854, p. 120.

<sup>3</sup> Da Costa Ferreira, A., "A Galiza e as . . . Minho e Tras os Montes," *Rev. d. Univ. d. Coimbra*, vol. ii, 1913, No. 1.

<sup>4</sup> Telesforo de Aranzadi, "Cranios de Guipuzcoa," *Assoc. Esp. Progr. Ciencias*, Madrid, 1913.



Duckworth,<sup>1</sup> discussing modern crania from Sardinia, refers to a "Series 2732" in which the length is 186·8, breadth 126·2, index 67·6, basi-bregmatic height 125·6, or nearly as great as the maximum breadth, nose broad (index 53·3), alveolar index 100·7, *i.e.*, the individuals are prognathous. The actual individual skull, No. 2732, has length 183, breadth 121, basi-bregmatic height 132, cephalic index 66·1, nasal index 50.

These characters agree on the whole with those above discussed, save that the Sardinian measurements run lower, even making full allowance for differences between measurements on the skull and those on the living head. Duckworth finds that the occiput may be much enlarged and that the basi-bregmatic height varies a good deal.

Collignon<sup>2</sup> speaks of oasis people (Type Gétule) in South Algeria and Tunisia, with almost Neanderthaloid foreheads, and a tendency to concavity of nasal profile. He also notes<sup>3</sup> the occurrence of several types of dark dolichocephals in the Dordogne, and asks for future studies of the origins, affinities and distribution of individuals with rough features, retreating foreheads, dark colouring, prognathism, weak chins and distinct dolichocephaly. He even suggests a link with the so-called "Canstatt Race" of *Crania Ethnica*,<sup>4</sup> and it will be remembered that this "Race" (but not the Canstatt skull) possesses the characters discussed, though the authors mix it up with the Neanderthal group.

Giuffrida-Ruggeri<sup>5</sup> notices incidentally a number of analogous skulls of males:—

|                              | L.  | B.  | B.-R. Ht. | C. I. | N. Ind. |
|------------------------------|-----|-----|-----------|-------|---------|
| From Tigre (North Abyssinia) | 193 | 131 | 140       | 67·9  | 50·0    |
| From Somaliland . . (a)      | 189 | 128 | 141       | 67·7  | 53·3    |
| (b)                          | 193 | 128 | 141       | 66·3  | 54·7    |
| From Egyptian Arabs          | 185 | 128 | 139       | 69·2  | 53·1    |

He believes these characteristics are of old standing in North-east Africa, and supposes they have influenced the evolution of Hamitic types. The skulls do not show prognathism.

Figs. 5 and 6 on Plate XXXV of Seligman's<sup>6</sup> study of Hamitic problems show many of the features under discussion. They are photographs of a Barabra. These various observations suggest that in many parts of Eurafrica, especially in remote localities, the characters noted in these papers are found sporadically at least.

<sup>1</sup> Duckworth, W. L. H., "Craniology of Sardinia," *Zeitsch. Morph. u. Anthr.*, xiii, 1911, p. 439 (where further references are given).

<sup>2</sup> Collignon, R., "Ethn. générale Tunisie," *Bull. géog.* t. i, 1886, p. 309.

<sup>3</sup> Collignon, R., "Dordogne, etc.," *Mem. Soc. Anthr. Paris*, t. i, No. 3, 1894, pp. 46 ff., 64.

<sup>4</sup> De Quatrefages, H., and Hamy, E. T., *Crania Ethnica*, Paris, 1882.

<sup>5</sup> Giuffrida-Ruggeri, V., "Quattro Crani preist. dell. Ital. merid.," *Arch. per l'Antr. e la Etn.*, xiv, 1915, p. 292.

<sup>6</sup> Seligman, C. G., "Some Aspects of the Hamitic Problem," *Journ. Roy. Anthropol. Inst.*, xliii, 1913.



The close analogy with characters of Australian skulls is also very evident. The measurements taken by Turner<sup>1</sup> are well known. L. 200, B. 132, C.I. 66.0, B.-B. Ht. 146, Bizyg. 149, Nas. I. 59.5. The skull is markedly hypsistenocephalic, the supraciliary arcs are very strong. The skull in question represents rather an extreme type among Australians.

Flower's interesting account of skulls from the interior of Viti Levu (Fiji)<sup>2</sup> shows the same characters. The supraciliaries are strongly marked, the length averages 198 and goes up to 204, and the breadth averages 128. The cephalic index is below 70 in the whole series and the minimum here is only 61.9. The basi-bregmatic height averages 142.7 in the males, and 137.2 in the females. The nose is broad (index over 53). Palate not V-shaped in cross-section.

Flower found that the coast people in Viti Levu were rather different, but they are still within the limits of the grouped characters under survey here. His averages are: L. 185, B. 127, C.I. 68.8, B.-B. Ht. 135, Nas. I. 52.4. From another island he got 6 skulls averaging L. 189, B. 135, C.I. 71.7, B.-B. Ht. 143, Nas. I. 50.1. In all the Fijian skulls, however, the orbits were not low (indices over 80).

From Sergi's<sup>3</sup> summary of many researches one gathers that corresponding characters occur here and there in the Pacific generally.

Rivet's<sup>4</sup> Lagoa Santa type is claimed to be an important primordial element in South America. The skull was long, narrow and high, with strong brow ridges and well marked prognathism. It is found to some extent with modifications in East Brazil, in South Patagonia and in Tierra del Fuego, in desert islands off Chile, on the coast of Ecuador, and perhaps in California. This distribution, on the whole, suggests a "driving-out" to the fringes of the American continent, and the characters do not occur in northern South America.

Reviewing the evidence for Australia, Fiji, etc., Sergi<sup>5</sup> comes to the conclusion that *Homo eurafricanus*, as he calls the average type showing the characters under discussion, continuing with modifications from Palæolithic into Neolithic and even into modern times in Europe, has spread at some time into the Pacific and has been preserved there.

We have followed notices of its survival also here and there around some of the fringes of Eurasia—Somaliland, North Africa, Sardinia, Wales, and doubtless Ireland, though we lack measurements in the last case. De Quatrefages and Hamy give notes of other survivals of the characters in question in their account<sup>6</sup> of the misnamed

<sup>1</sup> Turner, Sir W., *Challenger Reports, Zoology*, vol. x, 1884-6.

<sup>2</sup> Flower, Sir W. H., "Cranial Characters, Natives of Fiji," *Journ. Roy. Anthropol. Inst.*, vol. x, 1880, p. 153 ff.

<sup>3</sup> Sergi, G., *Europa*, 1908, p. 503 ff.

<sup>4</sup> Rivet, P., "La race de Lagoa Santa," *Bull. Soc. Anthr.*, v. 2, 1908, p. 264.

<sup>5</sup> Sergi, G., *op. cit.*, p. 498.

<sup>6</sup> De Quatrefages and Hamy, *Crania Ethnica*, Paris, 1882.



Canstatt Race, and it is probable that detailed surveys will reveal more nests of these characters in remote spots.

Discontinuous distribution in very diverse situations is usually evidence of restriction of a former widespread occurrence rather than of a chain of migration. It is more illuminating to use the hypothesis, justified by the resemblances between ancient and modern heads, that the characters in question are ancient ones which distinguished an early human spread. One may add to this that most breeds have modified or lost these features, but that they linger on in remote spots, especially on fringing lands.

It is an important justification of this hypothesis that the characters under consideration are found in certain ancient skulls.

Giuffrida-Ruggeri<sup>1</sup> says that, in the later part of the Palæolithic Age in Europe, there were the following types :—

1. Negroids, like those of Grimaldi.
2. A few brachycephals.
3. Cro-Magnon types—truly platycephalic, leptorhine, chamæprosopic, orthognathous and tall.
4. *Homo aurignacensis* [Galley Hill, Brünn I, Brûx, etc.]—hypsistenocephalic, usually platyrrhine, mostly prognathous, mesodolichoprosopic, short.

This is a clear advance on the too prevalent habit of lumping all late Palæolithic types and sundry into a "Cro-Magnon" Race. Perhaps it suggests an over-emphasis on distinctions between 1 and 4, distinctions which nevertheless exist.

As regards Types 1 and 4, it will be useful to mention the following, which are generally allowed to be late Palæolithic examples :—

Brünn I,<sup>2</sup> L. 204, B. 134 or 139, C.I. 65·7 or 68·1, B.-B. Ht. 140, glabella and supraciliaries prominent, forehead retreating, *elissoide pelasgico* (Sergi),<sup>3</sup> Pent. long. (Giuffrida-Ruggeri). Sergi thinks Brünn could not have been prognathous (p. 107 of his *Europa*).

Brûx,<sup>4</sup> L. 190-195, B. 130-135, C.I. 69·9, according to Schwalbe; or L. 201, B. 124, C.I. 61·7, according to Sergi. Supraciliary arcs very strong, *elissoide pelasgico* (Sergi).

Ofnet VI,<sup>5</sup> 21, i, L. 200, B. 141, C.I. 70·5, B.-B. Ht. 143, Nas. I. 61·9, Orbital I. 70-73. (Transition to Neolithic.)

<sup>1</sup> Giuffrida-Ruggeri, V., "Quattro Crani preist. dell. Ital. merid.," *Arch. per l'Antr. e la Etn.*, xlv, 1915, p. 292.

<sup>2</sup> Makowsky, "Der dil. Mensch im Löss von Brünn," *Mit. Anthr. Ges. Wien*, xxii, 1892.

<sup>3</sup> The references to Sergi in this list are taken from his *Europa* (see above); his work gives bibliographical details.

<sup>4</sup> Schwalbe, G., "Brûx Skull," *Zeitsch. für Morph. u. Anth.*, Stuttgart, 1906, Sonderheft.

<sup>5</sup> Schliz, A., in *Die diluviale Vorzeit Deutschlands*, 1912.



Combe Capelle,<sup>1</sup> L. 201, B. 134, C.I. 68.2, B.-B. Ht. 137, Nas. I. 63, Orbital I. 74.4, Alv. I. 103.9 (*i.e.*, fairly marked prognathism), hypsistenocephalic, strong supraciliaries. Alternative measurements are L. 198, B. 130, C.I. 65.7.

Grenelle, Carrière Helie, Calotte cranienne du gravier de fond.<sup>2</sup> Bone thick, as in several ancient skulls and in some of the Australian and Pacific skulls mentioned. Root of nose wide, forehead retreating, supraciliaries strong.

Denise,<sup>3</sup> fragment, chiefly frontal bone. Root of nose broad, supraciliaries strong, glabella prominent, forehead retreating, sulcus between forehead and glabella. Keith is clear that it does not belong to the Neanderthal type.

Grimaldi, Grotte des Enfants, Niveau inférieur.<sup>4</sup> So-called negroid adolescent. L. 192, B. 133, B.-B. Ht. 137, Bizyg. 130(?), C.I. 69.27, Orbit 26/39 (very low), Nose 25(?)/46 (decidedly broad).

In addition to the above, which are generally reputed Palæolithic and which show most of the associated characters noted in this paper, there are several other continental skulls also reputed Palæolithic, which show some of the characters under discussion, but linked with very different ones. Chancelade<sup>5</sup> has the hypsistenocephaly and marked dolichocephaly, but the height is enormously greater than the breadth, the nose is narrow and the orbits are high, the supraciliaries and glabella are moderate. The Obercassel skulls<sup>6</sup> have the great supraciliaries and a good deal of hypsistenocephaly, but in No. 2 (male) the face is broad and suggests the Cro-Magnon type. The nose is relatively narrow, and the orbits short and high. Both Chancelade and Obercassel are Magdalenian. Is Obercassel 2 a cross-bred type?

The Predmost<sup>7</sup> skull of a youth about 12 years old is sometimes associated with that of Brünn, but this is doubtful. It is true that the nose is 20/40, *i.e.*, rather broad, and that the orbit is 30/38, *i.e.*, rather low, and that there is clear prognathism, but the height of the skull is too small, and its dimensions, 176×134, give an index of 76.1. The Lautsch<sup>8</sup> skull (Fürst Johann Cave) has the requisite height and a fairly low index, but the nose is just too narrow, L. 193, B. 141, C.I. 73.1, B.-B. Ht. 140,

<sup>1</sup> Hauser, O., *Præhist. Zeitsch.*, 1910, p. 273. Appendix by Klaatsch, p. 285. Giuffrida-Ruggeri, V., "Posizione antro. d. Combe Capelle," *Riv. antro.*, vol. xxi, 1916-17.

<sup>2</sup> Hamy, E. T., "Nouv. mat. p. servir palæont. humaine," *Comptes rendu Congrès anth. de Paris*, 1889.

<sup>3</sup> Sauvage, *Rev. d'Anthr.*, 1872, p. 289; Keith, A., *Antiquity of Man*, 1915, pp. 205-6; de Quatrefages, H., and Hamy, E. T., *Cran. Ethn.*, Paris, 1882, pp. 15 and 16.

<sup>4</sup> Verneau, R., *Les Grottes de Grimaldi*, vol. ii, Monaco, 1906, p. 146.

<sup>5</sup> Testut, L., "Squelette Quaternaire de Chancelade," *Bull. Soc. Anthr. Lyon*, viii, 1899.

<sup>6</sup> Verworn, M., "Menschenfunde in Obercassel bei Bonn," *Die Naturwissenschaften*, Heft 27, Jahrg. 2, 1914, pp. 645-650.

<sup>7</sup> Krix, *Beitr. zur Kenntniss der Quartärzeit in Mähren*, Steinitz, 1903.

<sup>8</sup> Szombathy, *Congr. internat d'Anthr. et d'Arch.*, xii, 1900 Paris, 1902, pp. 132, ff.



Bizyg. 135, Nose 24/50. Like the Chancelade and the Obercassel skulls it seems to belong to the Magdalenian Age. Among the Grimaldi skulls, that known as Barma Grande No. 2<sup>1</sup> has L. 206, B. 142(?), index about 69 to 71, sagittal line prominent but curves different from those of Combe Capelle. The height of this skull is extreme (158), but no one knows how much must be allowed here for posthumous deformation. The orbit is rather long and low, 30/43. The skull capacity seems to have been very large and the face is very different from that of the types listed above. A Barma Grande skull from the Musée de Menton,<sup>2</sup> with index 72.2, has enormous frontal sinuses and marked glabella and supraciliaries; it is also decidedly prognathous.

There are also some other presumably Palæolithic skulls with characters approaching those under discussion, but these skulls have been put down, at times, as female. Among them may be mentioned that from Stængenaes<sup>3</sup> with strong glabella and supraciliaries, and measurements about 200×147 (C.I. 73.5). There is also the supposed aged negroid woman from the Grotte des Enfants at Grimaldi,<sup>4</sup> with L. 191, B. 131, C.I. 68.8, B.-B. Ht. as much as 129(?), Orbit 27/38, nose 28/44. Brünn No. II<sup>5</sup> was put down by Schliz as a female of Brünn I; its dimensions are 192×139, giving a cephalic index of 72.3.

A Clichy skull<sup>6</sup> with dimensions 204×138, gives a cephalic index of 67.6 and the sketches show at least a marked recession of the forehead. The skull, known as Engis No. II,<sup>7</sup> has an index estimated at about 70 and the height is considerable. A female skull from the upper layer of the Grotte des Enfants at Grimaldi<sup>8</sup> had a long skull and face, glabella and supraciliaries strong, orbits well developed horizontally, and alveolar prognathism. A female skull from the Barma Grande Cave<sup>9</sup> has suggestions both of the characters under discussion and of the Cro-Magnon characters: L. 190, B. 136, C.I. 71.6, Bizyg. 130(?), orbit 31/42 (i.e., long), but nose 25/54 (i.e., narrow), face longer than in Cro-Magnon type.

Of British skulls we must first mention that from Galley Hill,<sup>10</sup> of much disputed age; alternative measurements are given in brackets: L. 203 (204), B. 130 (140), C.I. 64 (68.6), B.-B. Ht. 137, supraciliaries strong, bizygomatic breadth large.

Skull B from the Macarthur Cave at Oban<sup>11</sup> is also of doubtful date. Its

<sup>1</sup> Verneau, R., *Les Grottes de Grimaldi*, vol. ii, Monaco, 1906, p. 85.

<sup>2</sup> *Ibid.*, pp. 22, 77 and 85.

<sup>3</sup> Nilsson, S., *Habit. Pr. de Scand.*, Paris, 1868. De Quatrefages and Hamy, *Cr. Ethn.*, 1882, pp. 16-20.

<sup>4</sup> Verneau, R., *op. cit.*, p. 146 and pl. v.

<sup>5</sup> Schliz, A., *Die diluviale Vorzeit Deutschlands*, iii, Anthrop. Teil, 1912.

<sup>6</sup> De Quatrefages and Hamy, *Cr. Ethn.*, Paris, 1882, p. 102-3.

<sup>7</sup> *Ibid.*, p. 70. Giuffrida-Ruggeri, V., "Piccole comunicazioni," p. 257, *Archiv. per l'Antr. e la Etn.*, vol. xl., 1910.

<sup>8</sup> Verneau, R., *op. cit.*, pp. 63-64.

<sup>9</sup> *Ibid.*, p. 85.

<sup>10</sup> Newton, E. T., *Quart. Journ. Geol. Soc.*, li, 1895. Keith, A., *Antiq. Man*, 1915.

<sup>11</sup> Turner, W., "Cran. People, Scotland," *Trans. Roy. Soc. Edin.*, 1914-15, p. 171.



dimensions are  $205 \times 133$ , giving a cephalic index of  $70.2$ ; the orbit is  $31/42$ , i.e., distinctly long and low. The supraciliaries are well marked, and the skull is at least to some extent hypsistenocephalic.

The Langwith skull<sup>1</sup> is decidedly hypsistenocephalic and has strong brow ridges, but the basi-bregmatic height is rather small. Measurements: L. 192, B. 135, C.I.  $70.3$ , B.-B. Ht. 127.

The Dartford skull<sup>2</sup> is very long ( $207 \times 150$ , giving cephalic index  $73$ ), but does not seem to belong here. Keith relates it to the Cro-Magnon.

The Halling skull<sup>3</sup> has rather marked supraciliaries and a sloping forehead, but is rather too short for our type; its height is considerable, but it is hardly hypsistenocephalic, its curves are more rounded. The Ipswich skull<sup>4</sup> has the forehead receding and the glabella prominent, but its dimensions are not quite those we are studying, L. 192, B. 144, C.I.  $75$ . The larger Borris<sup>5</sup> skull (R. Nore, Ireland) has the supraciliaries prominent, the forehead retreating, the zygomas strong, and it is very prognathous. Its dimensions are  $203 \times 150$ , giving an index of  $73.9$ . The Muskham skull<sup>6</sup> (Trent Valley) has the forehead low and narrow, but not markedly retreating, the supraciliaries are well developed, the height is great. Measurements: L. 180, B. 137, C.I.  $76$  (i.e., considerably above that of the Brunn group), sagittal line fairly prominent, auricular height 122.

The Cheddar skull<sup>7</sup> has the supraciliaries well marked and the skull high, but well arched, and not hypsistenocephalic; there is much less prognathism than in the Combe Capelle skull. L. 196, B. 138, Auric. Ht. 115, C.I.  $70.4$ .

These British skulls are, usually, of doubtful date, and it will be noticed that in general they are better rounded and less hypsistenocephalic than those of the Combe Capelle group proper, but they retain some of the features shown by that group. Probably most of them are rather later in date, but a great age was once claimed for the Ipswich skull, though that claim has been discarded in favour of an Aurignacian date.<sup>8</sup> The better rounding of the skull is related to the higher cephalic index in the majority of them.

The above survey of certain of the later Palæolithic skulls may be held to justify the view that the associated characters under consideration were features of one of the

<sup>1</sup> Mullins, E. H., *Derbyshire Archaeol. and Nat. Hist. Soc. Trans.*, 1913, p. 1; Keith, A., *Antiq. Man*, 1915, pp. 84-91; Giuffrida-Ruggeri, V., "Quattro Crani preist. dell Italia," *Arch. per l'Antr. e la Etn.*, xiv, 1915, p. 292.

<sup>2</sup> Keith, A., *Antiq. Man*, 1915, p. 166.

<sup>3</sup> Keith, A., "Report Human Remains, Halling, Kent," *Journ. Roy. Anthropol. Inst.*, 1914, vol. xlv, p. 228.

<sup>4</sup> Keith, A., and Moir, J. R., *Journ. Roy. Anthropol. Inst.*, vol. xlii, 1912, p. 345 ff.

<sup>5</sup> Huxley, T. H., in *Prehist. Remains, Caithness*, 1866, p. 125 ff.

<sup>6</sup> *Ibid.*, p. 120.

<sup>7</sup> Seligman and Parsons, "The Cheddar Man," *Journ. Roy. Anthropol. Inst.*, 1914, vol. xlv, p. 241.

<sup>8</sup> Moir, J. Reid, *Nature*, xcvi, p. 109, 1916.



types of the Aurignacian age, with two subordinate varieties, one of which was more African than the other. The discussion of the skulls from England and of certain Magdalenian skulls points to the combination of some of our associated characters with other characters from other breeds such as the Cro-Magnon. It may also be said to indicate a general improvement of the rounding of the skull in some cases, especially in Britain, and an increase of height of the skull in others.

But some of the associated characters do not disappear, and we must next mention instances of their occurrence in skulls of later prehistoric periods. In the first place there are three British skulls :—

Ledbury Hall<sup>1</sup> skull (river bed) with large supraciliaries, but not markedly hypsistenocephalic and possessed of an index of 77 ( $181.6 \times 139.7$ ). The Heathery Burn Cave skull belongs to a "race<sup>2</sup> of rather small and lightly made men with prominent supraciliary ridges and projecting nasal bones." The Aberavon skull<sup>3</sup> is more hypsistenocephalic and has the prominent ridges and retreating forehead.

In the second place there are skulls from British long barrows and from other megalithic monuments. The characteristics of long barrow skulls are a matter for separate discussion, but one may at any rate lay stress on the probability that these long barrow men inherited some characters from ancestors possessing the assemblage under discussion in this paper. These skulls are typically dolichocephalic, but often of more rounded contours than those of the Combe Capelle skull. In the majority the nose is narrow and the orbit is high. It is the strength of supraciliaries and glabella, and the low index, that relate them to the Combe Capelle group, though these features are not enough to place them within that group.

The Uley skull<sup>4</sup> has a length of 203 and a breadth of 145, giving an index of 71, the skull is hypsistenocephalic, the forehead narrow, contracted and rather receding, the frontal sinuses marked, the chin poor. The skull fragments from Stoney Littleton are said to resemble Uley closely. The Rodmarton skulls<sup>5</sup> are similar on the whole to that of Uley.

The Torlin skull B (Arran)<sup>6</sup> has a length of 201, breadth 134, cephalic index 66.6, basi-bregmatic height 132, *i.e.*, approximating to the characters under discussion, but has a narrow nose. Skull A is less characteristic. The Clachaig skulls (Arran)<sup>7</sup> are of similar type with long orbits, and one has a broad nose, but the supraciliaries are moderate and the individuals are orthognathous.

<sup>1</sup> Laing and Huxley, *Prehist. Remains, Caithness*, 1866, pp. 114–15.

<sup>2</sup> *Ibid.*, p. 124.

<sup>3</sup> Keith, A., *Antiquity of Man*, 1951, p. 39.

<sup>4</sup> Davis and Thurnam, *Crania Britannica*, 1865, plates 5 and 59.

<sup>5</sup> Bryce, T. H., *Proc. Soc. Antiq. Scot.*, 1902, 1903, 1909.



The Nether Urquhart skull<sup>1</sup> has dimensions  $187 \times 138$  (cephalic index 73.8), and the norma frontalis shows partial hypsistenocephaly, though the basi-bregmatic height is only 128. The nose measures  $24/45$  and the orbit  $28/38$ , so, in these two matters, the measurements are near those which interest us here. The glabella and supraciliaries are well marked, and the forehead recedes.

Some of the Nether Swell skulls<sup>2</sup> are dolichocephalic, with strong supraciliary ridges and receding forehead.

Two of the West Kennet skulls<sup>3</sup> are distinct from the other skulls in the barrow, and measure  $196 \times 132$  (cephalic index 67), and  $193 \times 140$  (cephalic index 72) respectively. The skulls are thick, hypsistenocephalic, with full glabella and overarched brows, orbits rather long. They depart from the standard of this article in being orthognathous.

Helpertorpe<sup>4</sup> has fairly similar characters with the nose rather broad,  $25/48$ , but it, also, is orthognathous. Helpertorpe is a round barrow.

The Muckde Heog Kist,<sup>5</sup> Isle of Unst, Shetland, had a skull with supraciliary ridges, retreating forehead, long orbits.

The Ebberston Long Barrow Skull<sup>6</sup> must have been very long, though it is too broken for exact measurement; the forehead was low and retreating, and the skull was almost certainly hypsistenocephalic.

The Kennet skull<sup>7</sup> (round barrow) has the supraciliaries most unusually full, the forehead narrow and receding, the orbit on one side rather long, the occiput prominent. Its dimensions are  $196 \times 145$  (cephalic index 74). It is not really hypsistenocephalic.

The Acklam Wold<sup>8</sup> and Langton Wold<sup>9</sup> skulls have tremendous supraciliaries, but they are orthognathous, the orbits are high, the noses rather narrow, and the jaws altogether different.

The Papa Westray skull<sup>10</sup> measures  $196 \times 144$  (cephalic index 73.5), its basi-bregmatic height is 139 (i.e., somewhat less than the breadth though still great), the orbit is long ( $33/42$ ), but the nose is narrow ( $23/51$ ), the forehead is somewhat retreating, and the glabella and supraciliaries are well marked, the skull is orthognathous. The vertex is flattened in this case.

<sup>1</sup> Turner, Sir W., "Cran. People, Scotland," *Trans. Roy. Soc. Edin.*, 1914-15.

<sup>2</sup> Rolleston, "On the People of the Long Barrow Period," *Journ. Roy. Anthropol. Inst.*, 1876, p. 138.

<sup>3</sup> Davis and Thurnam, *op. cit.*, Plate 50.

<sup>4</sup> Greenwell and Rolleston, *British Barrows*, p. 617.

<sup>5</sup> De Quatrefages and Hamy, *Crania Ethnica*, 1882, p. 494.

<sup>6</sup> Thurnam, *Archæol. Journal*, xxii, 1865; and Greenwell and Rolleston, *Brit. Barrows*, p. 622.

<sup>7</sup> Davis and Thurnam, *Crania Britannica*, 1865, Plate 11.

<sup>8</sup> *Ibid.*

<sup>9</sup> Greenwell and Rolleston, *British Barrows*, p. 603.

<sup>10</sup> Petrie, G., *Proc. Soc. Antiq. Scot.*, ii, 1859; also Turner, Sir W., *op. cit.*



Among the Keiss skulls<sup>1</sup> are some with fairly low cephalic index, strong glabella and supraciliaries, prognathism and so on, but with the exception of one, they are not markedly hypsistenocephalic, and for the most part they show fairly rounded contours.

These British skulls show tendencies to depart from the type characters in respect of the nose and the orbit, the curvature of the skull, and they also tend to orthognathism. Those which are orthognathous with narrow noses and high orbits, and well rounded contours, approach what it is customary to designate the Nordic type, and that type often shows a good development of glabella and supraciliaries. We may note analogous points in Swedish skulls.

Among the skulls described by Fürst,<sup>2</sup> No. 13 (Visby, Gotland) is that of a male with measurements  $193 \times 139$  (cephalic index 72), basi-bregmatic height 137 (i.e., hypsistenocephalic), prominent glabella and supraciliaries, but narrow nose and high orbits and powerful jaws. The majority of the skulls described by Fürst are considered by him to be variants of one type, the fine long Nordic skull with strong glabella and supraciliaries, at first steeply and then gently rising forehead-profile, strong occipital prominence, long face, rectangular orbits, high narrow nose, orthognathism, strong chin, modification of the elliptical norma verticalis through flattening of the forehead outline and pointing of the occiput.

Among the skulls described by Retzius,<sup>3</sup> a large number of the dolichocephals have the basi-bregmatic height almost if not quite as great as the maximum breadth, but in several the contours are too well rounded to allow the sagittal line to stand out. It does so, moderately, in No. 9 (Knaggegarden, Westergotland) which has fairly strong supraciliaries and occipital prominence, but a well rounded skull contour. The measurements are  $197 \times 135$  (cephalic index 68.5), basi-bregmatic height 142, nose 23/50 (rather narrow), orbit 31/39 (moderate). No. 34 (Hvellinge, Skåne) gave measurements  $196 \times 137$  (cephalic index 69.9), basi-bregmatic height 138, strong supraciliaries and glabella, forehead slopes back, and vertex of head is well behind bregma. No. 43 (Torfmoor, Skåne) has measurements  $196 \times 133$  (cephalic index 67.9), basi-bregmatic height 135, nose 26/53 (moderate), orbit 32/38 (moderate), the glabella and supraciliaries are strong, and the chin and nose prominent, the forehead is low and retreating. No. 44 is analogous but shorter, and may possibly be female. No. 33 merits special mention. Its sagittal line is almost as marked as in hypsistenocephalic skulls, and the basi-bregmatic height is great (149), but the dimensions of the skull are  $186 \times 145$ , giving an index of 78. The nose is just on the narrow side (22/46), the orbit moderate (32/41). The cephalic index would be higher still were it not for the occipital "chignon." The glabella and supraciliaries are very

<sup>1</sup> Laing and Huxley, *Prehist. Remains, Caithness*, 1866.

<sup>2</sup> Fürst, Carl M., "Zur Kranologie der Schwedischen Steinzeit," *Kg. Svenska Vet. Akad. Handl.*, Bd. 49, No. 1, Stockholm, 1912.

<sup>3</sup> Retzius, G., *Crania Suecica Antiqua*.



strong and the bones very thick. The above skulls are supposedly prior to the Bronze Age. No. 65 is of the Bronze Age, with dimensions  $195 \times 135$  (cephalic index 69.2), and basi-bregmatic height 138. The occiput, glabella and supraciliaries are all prominent, the bones thick, the sagittal line fairly prominent, and there is some prognathism. From archaeological finds we know the Bronze Age to have been a period of prosperity in South Scandinavia, and from Pettersson's climate studies<sup>1</sup> we gather it was a time of weak tides and mild climate, and that at the end it graded (650–400 B.C.) into a period of strong tides and climatic extremes. In connection with the last point we may note the traditions of southward raids of Cimbri and Teutones, and the marked diminution of all except the pronouncedly dolichocephalic types in the early Iron Age graves. The chances are that Bronze Age and pre-Bronze Age immigrants into the area drifted out again, but one may have the graves only of a leader class. Among the Iron Age skulls Retzius' No. 75 is of interest. Measurements are  $188 \times 136$  (cephalic index 72.3), basi-bregmatic height 140, nose  $23/50$ , orbit  $32/42$  (rather long), glabella strong, supraciliaries weak, narrow nose, prognathism, prominent sagittal line. No. 91, a female, is even more interesting, for it is hypsistenocephalic with strong occiput and glabella and supraciliaries. Its measurements are  $185 \times 134$  (cephalic index 72.4), basi-bregmatic height 130, nose  $25/47$  (fairly broad), orbit  $30/42$  (long).

A number of Retzius' skulls approach the Nordic type, as do those of Fürst.

It should be noticed that, within historic times, the number of broad-heads has apparently increased again, more so in Denmark than in Sweden.

The Kurgan skulls from Russia, of which we have valuable studies by Bogdanof<sup>2</sup> and by Sergi,<sup>3</sup> are of interest here. The Kurgans are of varying antiquity and are found chiefly in South Russia between lines drawn from Kief to Kazan, and from Kherson to Saratov, i.e., in the loess region south of the forest lands of Muscovy.<sup>4</sup> Sergi worked out the forms of 1067 skulls from Kurgans, and saw that 56.13 per cent. belong to his "Eurafian" type, and 43.94 to his "Eurasian" type. The latter is the brachycephalic type of head, the former is the dolichocephalic type with several varieties, and he believes the dolichocephals to represent the fundamental European type, as also do most anthropologists.

Among these 56.13 per cent. (598), he picks out in his "Europa"<sup>5</sup> about 90 skulls, of which he gives measurements, and, of these 90, twelve conform in the essential measurements to the type emphasized throughout this paper, while of 12 more the few measurements given suit the type. Still another twelve show a close

<sup>1</sup> Pettersson, O., "Climatic Variations in Historic and Prehistoric Time," *Ur Svenska Hydrografisk-Biologiska Kommissions Skrifter*, v, 1914, Göteborg.

<sup>2</sup> Bogdanof, see "International Congress Prehistoric Anthropology," Moscow, 1892.

<sup>3</sup> Sergi, G., see "Catalogo var. um della Russia e del Mediterraneo," *Soc. rom. di antr.*, i, 1894.

<sup>4</sup> See Sketch Map in Sollas, W. J., *Ancient Hunters*, 1915, p. 11.

<sup>5</sup> Sergi, G., *Europa*, 1908, p. 309.



approximation, but in different cases diverge as to orbital index, nasal index or other details, but only small divergences are included among our twelve. The general characters which stand out among these selected skulls are lowness of the cephalic index, great basi-bregmatic height sometimes even superior to the breadth, bizygomatic breadth often great, orbit long and low (orbital index about 70, and not over 80), nose broad (nasal index over 50).

Of the ninety Kurgan skulls, the measurements of which are given, actually fifty-one have the basi-bregmatic height equal to or greater than the maximum breadth; sometimes the excess is slight as in the typical skull from Combe Capelle, sometimes it is practically as great as in the Chancelade skull.

It is useful to follow out the relation of the cephalic index to this character of great basi-bregmatic height.

Index under 69. All 8 skulls have the basi-bregmatic height not less than the maximum breadth.

Index 69. 2 of the 3 skulls have ditto.

Index 70. 3 of the 4 skulls have ditto.

Index 71. 8 of the 10 skulls have ditto.

Index 72. 6 of the 7 skulls have ditto.

Index 73. All 9 skulls have ditto.

Index 74. Only 2 of the 6 skulls have ditto.

Index 75. Only 4 of the 10 skulls have ditto.

Index 76. Only 4 of the 10 skulls have ditto.

Index 77. Only 2 of the 6 skulls have ditto.

Index 78. Only 3 of the 8 skulls have ditto.

Index 79 and over. None of the 9 skulls have ditto.

The change clearly comes at 74, a point which should be set beside that made at the beginning of this paper. It seems clear that we are dealing with a group of characters, the limiting value of the associated cephalic index of which is about 74.

Thick skulls with low indices, great heights, broad noses, belonging to men of short stature are described by Inostranzef from L. Ladoga.<sup>1</sup> They are clearly near the types under consideration.

Sergis' statements<sup>2</sup> about Bohemia and Switzerland seem to make it clear that these old dolichocephalic types occurred in those regions.

We shall thus be justified in supposing that the group of characters under discussion were widely distributed among the fundamental post-glacial population of Europe south of the Tundra and north of the mountain axis of the continent. This may be stated without making any claim that they were universal at any time. The Cro-Magnon characters and others may well have existed among individuals side by side with those possessing our grouped features, and, indeed, individual

<sup>1</sup> See Harold Peake, "The Finnic Question," *Journ. Roy. Anthr. Inst.*, xlix, 1919, p. 196.

<sup>2</sup> Sergi, G., *Europa*, 1908, p. 262 ff.



skeletons, like the Obercassel, distinctly hint at a combination of characters from the two groups. And other groups of characters may have occurred as well.

There is no doubt about the occurrence of the characters we are seeking, in Neolithic Gaul, though Salmon's *Dénombrement*<sup>1</sup> is not of great use for the purpose in hand, and it seems increasingly likely that megalithic graves, even if they have no bronze, must be reckoned as belonging either to the end of the Stone Age or to even later times, and some of the skulls Salmon mentions are from megalithic graves. Since the date of Salmon's list a very long skull has been found at Bas Moulins,<sup>2</sup> index 66·84. A skull from the dolmen at Bougon (Deux Sevres) was long and very prognathous, with very strong glabella and supraciliaries, and a retreating forehead.

Hervé<sup>3</sup> connected two skulls of supposed Neolithic date from Brittany with the "negroids" of Grimaldi. That from Conguel had a length of 185, breadth 131, cephalic index 70·8, basi-bregmatic height 136, orbital index  $77\frac{1}{2}$  (rather too high for our group-character), broad nose (index 57·1); and that from Toul Bras, length 183, breadth 135, cephalic index 73·8, basi-bregmatic height 138, orbital index 86·1 (high), broad nose (index 52·3). Both are markedly prognathous and have strong supraciliaries. Of skulls of later date in France a number might be named, but it will suffice to mention that of S. Mansuy, Bishop of Toul in the fourth century,<sup>4</sup> with an index of 69·41, strong supraciliaries, retreating forehead, etc., and that of a modern woman of Boulogne<sup>5</sup> (Verneau) with length 180, breadth 133, cephalic index 73·9, basi-bregmatic height 131, orbital index 84·2, nose broad (index 66·7). The group of characters under discussion undoubtedly does occur in modern France, and Verneau<sup>5</sup> also discusses other survivals.

In the Iberian peninsula we have the well-known facts about skulls from Mugem.<sup>6</sup> One skull has the breadth 73 per cent. of the length and the basi-bregmatic height 97·1 per cent. of the breadth, the orbital index is 71·6 and the nasal index 50, and the skull is clearly prognathous, the brow ridges are strong. Jacques says that with the progress of the Neolithic period the supraciliaries decrease and so does the prognathism. Oliviera<sup>7</sup> also mentions a female skull from Casa de Moura with length 187, breadth 134, cephalic index 71·6, basi-bregmatic height 137, orbital index 79·5, nasal index 47·7. These are supposed to be of Tardenoisian age and, like the

<sup>1</sup> Salmon, P., "Dénombrement des crânes néolithiques de la Gaule," *Rev. mens. école d'Anthr.*, ann. 5, 1895, p. 155.

<sup>2</sup> *Anthropologie*, vol. xii, 1901.

<sup>3</sup> Hervé, G., "Crânes néolithiques armoricaines du type négroïde," *Bull. et mem. soc. d'Anthr. de Paris*, V série, t. iv. See also discussion in Verneau, R., *Les Grottes de Grimaldi*, Monaco, 1906, vol. ii, p. 187 ff.

<sup>4</sup> Godron, *Mem. Acad. Stanislaus*, Nancy, 1864.

<sup>5</sup> Jacques, V., "Etude ethn.," in Siret, H. and L., *Les premiers âges du métal dans le sud-est l'Espagne*, 1887; and in Oliviera, P., *Congr. Internat. Prehist.*, 1880, p. 291. See also A. A. Mendes Corrêa, "Origins of the Portuguese," *Amer. Journ. Phys. Anthr.*, vol. ii, No. 2, 1919, p. 122. This author discusses "Homo afer, var. taganus."



French Neolithic ones, tend to have the nose rather narrower and the orbits rather higher than the typical group-character allows.

The facts for Italy have been so thoroughly discussed by Sergi<sup>1</sup> and Giuffrida-Ruggeri<sup>2</sup> that it seems unnecessary to cover them once more. Ruggeri claims that these types still survive, and Duckworth confirms this. Skulls from the predynastic and later periods in Egypt show our group of characters.

There is thus widespread evidence for the occurrence of a certain group of associated characters among individuals here and there in most parts of South-west Europe, the British Isles, and the main European plain in past and present, and at least some ground for thinking that the types exhibiting this group of characters are an important element in the composition of the dolichocephalic populations of Europe. The characters, Sergi would say, are African. This may be so, but the physical geography, especially as regards climate, vegetation and habitability, was doubtless very different in post-glacial times from what it is now, and it may be wiser to imagine, at least tentatively, a general early spread northward and north-westward with disappearance of the ice, a spread that may for aught we know have started not only from Africa but from Western Asia as well. Ruggeri<sup>3</sup> thinks that while Combe Capelle and allied types are African, the dolichocephals without the special group characters are "Indo-European" in origin.

Must we think of these points of view as contradictory? May we not think of a general spread with subsequent racial evolution in, and on the way towards, different areas of characterization?

Before proceeding to study the matter from this point of view it may be wise to recall that some of the people with hypsistenocephaly, strong supraciliaries and zygomatics, prognathism, broad noses, etc., have this group of features associated with rather small measurements, exaggeration of the prognathism and, in living types, curly hair and intensified colour. Others have the same essential grouping, but it is associated with less marked prognathism, with wavy hair and less dark colouring on the whole, and with large, sometimes very large, head measurements. The second association is also distinguished by somewhat higher stature than the first, and its distribution appears to be distinctly more northerly.

In order to make an effort to understand the facts here noted it is important to try to realize some conditions of the later Palæolithic and the earlier Neolithic times. Augiéras<sup>4</sup> has recently added valuable detail to varied evidence already tending to show that the Sahara was inhabited by considerable numbers of Palæolithic men, and

<sup>1</sup> Sergi, G., *Europa*, 1908, especially ch. xi.

<sup>2</sup> Giuffrida-Ruggeri, V., "Nuove addiz. al tipo di Galley Hill," *Arch. per l'Antr. e la Etn.* vol. xl, 1910, p. 260; *Quattro Crani preistorici*, *ibid.*, xlv, 1915, p. 292; "La posizione antr. d. uomo d. Combe Capelle," *Rivista di Antr.*, vol. xxi, 1916-17.

<sup>3</sup> Giuffrida-Ruggeri, V., *Quattro Crani*, etc., v. sup.

<sup>4</sup> Augiéras, "Le Sahara Occidental," *Soc. de Géog.*, Paris, 1919.



Falconer<sup>1</sup> has indicated that in early human times the desert lay south of its present position. This tends to show that the latitudinal climatic belts were south of their modern locations in earlier times, a view which harmonizes with what we know of the then larger extension of glaciers in North-west Europe. The great ice sheets imply conditions of durable anticyclones<sup>2</sup> and corresponding rigour of climate in the European plain, and the pushing southward of the European track of the westerly winds. At present the westerly winds blow into the Mediterranean area in winter, but mainly along the zone north of the Alps in summer.

Visualizing a southward shift of the belts we should picture the westerlies blowing into the Mediterranean most of the year and, in winter, south of the Atlas. Especially as there are many traces of ostriches, whose eggs were evidently of interest to early inhabitants, and knowing that winter rain (from the westerlies) and summer sun would tend to produce open country (*i.e.*, not thick forest), we gather that the probabilities are in favour of considering that before it became a desert the Sahara was a region with some amount of open pasture, *i.e.*, a region reasonably favourable to early man. We also gather that even granting a desert belt to the south of the Sahara, it was in all probability narrower and less complete than it has since become with the northward shift and expansion of the latitudinal climatic belts.

The same general facts may be supposed to hold good for Arabia.

Huntington<sup>3</sup> and others have made much of the Pulses of Climate in Asia, giving a certain rhythm which complicates the process of desiccation to which the interior of Asia has long been subjected. With his special views we need not concern ourselves here. Wright<sup>4</sup> has given useful indications of a damper climate in West Central Asia in Pleistocene times, and this would naturally be the consequence of the spreading-in of the westerlies along the Mediterranean, Black, and Caspian Seas, instead of moving along the German lowland as now.

Broadly then, in late Palæolithic times, during the intermittent retreat of the ice which had previously formed a great sheet on the Alps, and a great sheet spreading from Scandinavia, we have the following picture of conditions:—

(1) Large glaciers still in the Alpine valleys, and cold conditions in the mountains generally.

(2) An ice-sheet making Scandinavia more or less uninhabitable.

(3) A cold steppe (for the most part) with a lot of loess occupying the belt north of the broken highlands of Central Europe, and continuing through South Russia. The loose friable soil of the loess is of itself rather unfavourable to tree growth, and in the late Pleistocene climate trees would be kept down still more.

<sup>1</sup> Falconer, *Geology and Geography of N. Nigeria*, Macmillan, 1911.

<sup>2</sup> See views of Simpson and of Hobbs. *Brit. Antarct. Exp., Meteorology*. Publ. Calcutta, 1919.

<sup>3</sup> Huntington, Ellsworth, *Pulse of Asia*, 1907; *Palestine*, 1911; *Climatic Factor in Arid America*, 1914. Pettersson, O., *op. cit.*

<sup>4</sup> Wright, G. F., *Quart. Journ. Geol. Soc.*, vol. 57, 1901, p. 248.



Nowadays there remain fragments of the ancient steppe here and there on the higher hill ledges, *e.g.*, of the Vosges, where the steppe horse persisted until the sixteenth century.

(4) A Mediterranean basin, cooler and wetter, for the most part, than now, with more cyclones spreading farther east than they do now.

(5) The Sahara, Arabia, Persia and West Central Asia much less desertic than now, but probably not forested. Probably the Aralo-Caspian depression spread westwards to Roumania, and part of Hungary may have been under water, thus separating the loess belt of Europe from lands lying to the south-east.

It is unfortunate that we know so little of skulls of Palæolithic date from the Sahara-Arabia belt, but we may surely suppose that they were some breed or breeds of ancient long-heads, and that the divergences, the "gulf fixed," between European and Tropical African long-heads were not so fully developed as they have since become. The spread of ancient long-heads northwards with improving climate, while the mountain region (Alps, etc.) still remained almost uninhabited, is a reasonable hypothesis to supplement the others.

As the climate improved northward:—

(1) The land was sinking in North-west Europe and the warmer ocean water of the Atlantic increasingly affected the North Sea, etc., *i.e.*, penetrated farther into the land than heretofore. The westerlies were shifting to their present track across Britain and the low countries. Both factors promoted increasingly damp climate, and the spread of forest at the expense of steppe along the European plain. It would be of value to archæologists in tracing routes of migrations if they realized that the loess zone would not be heavily forested.

(2) The glaciers of the mountain zone were diminishing and gradually opening this zone to invasion by broad-heads from mountains of less severe climate on the south-east. This seems a justifiable hypothesis when we reflect that the Alps were much more severely glaciated than the Carpathians and Illyrians and Anatolia.<sup>1</sup>

(3) The Mediterranean was grading towards its present condition of winter rains and summer drought, and some sinking movements were increasing the gaps, such as between Sicily and Africa.

(4) The Saharan-Arabian-West Central Asian belt was drying and pressing out its populations, and the barrier between Tropical Africa and the Mediterranean was growing.

The pressing of population northward and southward from the Sahara seems the most useful hypothesis to employ as a key to the comparative morphology of

<sup>1</sup> Myres, J. L., "The Alpine Race," *Geogr. Journ.*, 1906, 2, p. 537.



populations along its northern and southern flanks, i.e., around the West Mediterranean and in the Sudan, granting at the same time that in the latter case more recent invasions have had a lot of influence. We must add to this the spreading of population from the drying region of Arabia, etc., as well.

Recognizing that man in Neolithic times was as yet unable to dominate the forest, we should next try to distinguish the principal areas north of the Mediterranean which were habitable because unforested and not too wet. The loess areas of South Russia from the plateau of Galicia, south of the Pripet marshes, to the Urals may fairly be claimed as one of the chief of these areas<sup>1</sup> with the Rumanian basin as an offshoot. Farther west<sup>2</sup> the Galician plain is continued up the Vistula past Cracow, and then the loess branches, one line of it occupying the Moravian gate towards Vienna and so to the upper Danube, and the other spreading along the German fall line, when the hills grade down to the plain from Silesia to Hanover and the Rhine. West of the Rhine the amount of this type of surface increases in Flanders and Picardy and Beauce. The next type of area kept unforested would be that exposed to the salt sea winds, and here we may class the moorlands<sup>3</sup> of West Britain and West Ireland and West France, especially on areas of old hard rock with thin soil, and many areas along the west coasts of Scandinavia. Regions of sand dunes, such as the Baltic shores, would also be forest-free and fairly dry at the same time. The next class of "clear areas" are those on geological formations which absorb water specially quickly; in Germany<sup>4</sup> certain areas like the Muschelkalk, between Schwarzwald and Odenwald, would be clear, as also some other limestone patches. In France, patches like the Causses would enlarge the clear areas along the west edge of the Central Plateau due to bare granitic rock and to exposure to sea winds. France thus possesses a natural forest-free zone extending from the neighbourhood of Montpellier to the moorlands of Brittany. Another zone of small width but great importance extends along the north side of the Central Plateau, and is due mainly to an exposure of Jurassic limestones in Berry and Nivernais,<sup>5</sup> while the chalk of Champagne and Picardy and minor limestone patches were further districts open from early times.

On the other hand, regions near the edge of the previously existing ice sheet, regions still very damp, must have been still more troublesome in early prehistoric times ere the boulder clay accumulations had been to some extent rearranged by rain and rivers. This indicates the Prussian plain between the Baltic sand dunes and the line of loess as a difficult area, as also was, and still is, the north-west border

<sup>1</sup> Sollas, W. J., *Ancient Hunters*, 1915, Fig. 6.

<sup>2</sup> Vidal de la Blache, P., *Tableau de la géographie de la France*, 1911. "Carte pour servir à l'histoire de l'occupation du sol" (faces p. 54).

<sup>3</sup> See Fleure, H. J., and Whitehouse, W. E., "Ancient Distribution and Valleyward Movement of Peoples," *Archæol. Cambrensis*, 1916.

<sup>4</sup> See Schlüter, P., in *Mitteilungen der Naturforschenden Gesellschaft zu Halle*, vol. 1, 1911.

<sup>5</sup> Vidal de la Blache, P., *op. cit.*, pp. 153 and 158.



zone of historic Muscovy from Vologda to Dvinsk, and the low zone between the main streams of Vistula and Dnieper, designated Marshes of the Pripet (or of Pinsk, or Rokitno). The last-named region of special difficulty lay to the north of the loess zone, and has formed an important boundary throughout human times.

That these facts are of special interest in connection with archæology and anthropology is shown by the following details.

(1) The Kurgans, of varying age, abound on the loess zone of South Russia,<sup>1</sup> and the spread of the Alpo-Slav broad-heads from the Carpathian-Galician region into Russia<sup>2</sup> is mainly south of the Pripet swamps.

(2) The Beaker Settlements are chiefly on loess or sandy patches, *e.g.*, North Bohemia,<sup>3</sup> Halle and the country north-east of the Harz, Moravia, junction region of Main and Rhine—all on loess. The Oder mouth and the east shores of the Zuyder Zee represent sandy areas. The Kraichgau region not only has loess, etc., but has the Muschelkalk near by. Notwithstanding all this, however, Beakers are absent from the upper Danube loess and the French areas of this type.

(3) The dolmens of France<sup>4</sup> and her megaliths generally are on the clear areas above discussed, or quite close to them for the most part.

(4) The early settlement areas of Scandinavia are largely coastwise,<sup>5</sup> though not entirely so by any means.

(5) The matter has been argued out to some extent for Britain in my previous papers already quoted.

Granting, then, that the argument from geology and physical geography as to habitability of areas in early times is a legitimate one, we may argue that the following areas north of the Mediterranean could become of importance as centres of population :

(a) The south of Russia.

(b) Bohemia, Moravia and Silesian foothills, and the west side of the Hungarian Danube.

(c) The Baltic shores and those of the Skagerrak and Cattegat, and of the Low Countries.

(d) A very considerable area of varying type in West and North-west France, as well as a zone of linkage, along the south-west side of the Plateau Central, with the Mediterranean.

(e) Several moorland and limestone areas in the British Isles.

<sup>1</sup> See map in Myres, J. L., "The Alpine Race," *Geogr. Journal*, 1906, 2.

<sup>2</sup> Ripley, W. Z., *Races of Europe*, 1899. Map, Cephalic Index, E. Europe (opposite p. 340).

<sup>3</sup> See *Pie Starozitnosti*, vol. i, part 1, 1899.

<sup>4</sup> See map of Dolmens, p. 128 of *la Gaule avant les Gaulois*, A. Bertrand, 1891 and A. de Mortillet, "Dolmens et Menhirs en France," *Rev. Mens. d'Anthr.*, vol. ii, 1901, p. 33.

<sup>5</sup> Brügger, A. W., and Montelius, O.



Add to this especially the coasts of the West Mediterranean, with considerable areas on the Iberian peninsula open in increasing degree because of the increasing summer drought, and never thickly covered because they had considerable limestone areas.

The Illyrian and Balkan and Anatolian areas, through their great height and difficult slopes, belong essentially to the mountain zone and formed a separate region in early times, inhabited by broad-heads.

If we suppose an early and general spread of long-heads, among whom the group of characters listed on page 15 occurred frequently, and we allow for the existence of other types of long-heads as well, we may attempt to trace the fate of these old populations in some of the above areas, and especially their further evolution so far as it can be inferred.

As regards the south of Russia we must note that this area has been subject to intense pressure from broad-heads both from the west (Alpo-Slavs from Galicia) and from the east (Asiatic types). The Cossack territories are nevertheless reputed to show slightly lower cephalic indices on the average than either the Ukraine (Slavonic wedge), or the Crimea (Tatar).<sup>1</sup> A long argument would be needed to bring out appropriately the relation of the "Beaker" people to the Tripolji area near Kief<sup>2</sup> and their true physical characters, but it is worth noting in passing that though the typical Beaker Man of English graves is a broad-head he has the great brow ridges and other features which it is not impossible that he may have inherited from men with our grouped features. There may, however, be alternative interpretations here.

As regards Bohemia, etc., the occupation of the mountain zone by the broad-heads may well have wiped the older types out, but perhaps we do not know enough about the people of this region. The case of Hungary is inevitably complex, almost beyond argument.

The Baltic area (*sens. lat.*) is an important area, fairly isolated from others, and with distinctive environmental factors offering strong contrasts to those of the Mediterranean. The Low Countries and France may be thought of as a link between the two, with Britain as an off-lying area. It is proposed to argue for the Baltic and the West Mediterranean as areas of characterization of the Nordic and Mediterranean types, both being regarded as products of, to some extent divergent, evolution from early long-heads, among whom our characters were common.

#### "The Nordic Type."

The Baltic area is cloudy, with cold spells modified by the passage of rainy cyclones, for which that inland sea offers a suitable eastward track. Pettersson<sup>3</sup> claims that

<sup>1</sup> See Ripley, W. Z., *Races of Europe*, map opposite p. 340.

<sup>2</sup> But see Peake, H. J. E., *Journ. Roy. Anthropol. Inst.*, xlii, 1916, and references in that paper.

<sup>3</sup> Pettersson, O., *Climatic Variations*, etc., see note, p. 26.



astronomical causes affect the strength of tides cyclically, and that the Baltic is a critical area in this way because a strong-tide period means more salt water in that sea and consequently more fish, but on the other hand a thinner brackish-water over-layer more liable to freeze in winter. He thinks that the Viking period and the Scandinavian Bronze Age were periods of weak tides and mild climates, while the fourteenth century and the Early Iron Age of Scandinavia were periods of strong tides and climatic violence. He thinks, too, that the Scandinavian Neolithic Age included a period of weak tides and mild climate, but that there was then a better entry for sea-water, and that later conditions hardly applied. Between that time and the Scandinavian Bronze Age would have come a time of climatic severity, probably with thinning of the population and severe selection.

Life in that area has usually meant hard exercise and a good deal of flesh products for food (through hunting and fishing). This life implies slowness of oncoming of sex maturity and with this, long continuance of growth. The life and the food make for muscularity, and the strong muscles imply strong bones with suitable roughnesses of surface for attachments of the muscles. The cloudy conditions seem also to be helpful to growth. They are certainly helpful as regards delicacy of sight and senses generally, and the mode of life implies not only keenness of senses but quick co-ordination of sense impression and muscular contraction. This delicacy of the metabolic balance would be greatly assisted by the moderation of temperature variations. We thus have a useful idea of Baltic conditions as helping to evoke the tall, strong-boned, keen-sensed Nordic type, with his long head often showing supraciliary ridges and other traces of the group characters on page 15. He is, however, rarely hypsistenocephalic, but has the skull well vaulted and finely curved, *i.e.*, well filled out. It seems right to say that in a region like the Baltic parental care would be a necessity to a greater degree than in warmer climes, and the influence of this upon the growth and filling out of the skull may be suggested.

Woodruff<sup>1</sup> has argued out the relation of pigmentation to light, and brings out the points that the rarity of strong light and the temporariness of snow-glare in the West Baltic region, with its sea-coasts and sheltering forests, would diminish the need for pigment as a protection against the actinic rays. Moreover, pigment is a positive disadvantage during cold spells because radiation is far greater from a pigmented surface. Allowing these opinions and appreciating the using up of growth-energy in other directions, we thus understand the fact that the flaxen hair and blue eyes so widely found accompanying protected infancy are very little altered throughout life in the Nordic Race. Woodruff also mentions the nose, suggesting the need for a large nose with narrow nostrils, the latter in order that cold air may not flood in, the former in order that it may be warmed before it goes down to the lungs. One may add that this type of nose would be less useful in real Arctic areas and areas

<sup>1</sup> Woodruff, C. E., *Tropical Light*, 1905, chs. 8 and 9.



of long severe anticyclones, because of danger of frost-bite. The forward growth of the nose has made the face much less flat, and the profile is more clearly pointed, as the typical Nordic chin shows. There seems to be diminution of growth of the upper jaw, as the type is very rarely prognathous. The moderation of temperature and absence of too long and bitter anticyclones permits relative slackness of skin pores, with variability of growth of hair as a consequence. This gives the wavy hair characteristic of Europe, including the Baltic area.

It is to be noted that Huntington<sup>1</sup> claims to show from statistics the physiological optimum for mankind to be a temperature of about 64° F. (or say 55° F. to 70° F. midnight and midday), with modifications not too great and not too prolonged but none the less fairly marked. The value of the West Baltic region to humanity in this connection must be very considerable, with its January and July average temperatures round about 30 and 60 respectively, and the energy of the Nordic type is one of its best-known features.

We thus reach an approximate definition of the Nordic type.

Tall, strong-boned, bones often with projections for firmer attachment of the powerful muscles, fair wavy hair, blue eyes, long face, fine profile, strong narrow nose and chin. The skull tends to be long but well filled out and rather finely curved, retaining, however, something of the supraciliary ridges and other marks of some early long-headed types which have contributed to the evolution of the Nordic. Comparison with earlier types brings out especially the better growth of the lateral frontal region.

Going north-eastwards to the Arctic regions we find more Mongoloid features, and these occur among the Nordic and partly Nordic peoples all around the Baltic, especially on the east (many Finlanders and so on).

Going eastwards we approach regions of marked winter anticyclones, and the hair becomes straight by uniform growth all around in a tight skin pore.

#### *"The Mediterranean Type."*

Taking next the people of the Western Mediterranean basin, we remember that in early human times the breaks between South-west Europe and North Africa may have been even less marked than now, and that early man was being driven out from the Sahara in all directions. The Sahara never, however, became an absolute barrier. So we have hints of transition from the area of characterization of the Mediterranean Race in the western basin of that sea, to the area of characterization of the Semitic Race on the borders of Arabia, and from both to the so-called Hamitic peoples of the Sudan and so on, the latter having probably been much influenced by immigrants across the desert. The problem of the characters of the long-heads in the *Ægean Isles*, etc., may be attacked on these lines, but is omitted from this paper.

In the West Mediterranean the climatic cycle of winter rains and summer sun

<sup>1</sup> Huntington, Ellsworth, *World Power and Evolution*, 1919, chs. 5 and 6.



was establishing itself in a land of limited coastal strips, mostly without great forests to daunt mankind. The climate encouraged cultivation and the settled life, with more dependence on cereals and fruits than on flesh food, and more interest in the arts and crafts and in politics than in the chase. The climate was increasingly warm and the light increasingly strong.

The warmth and settled life led to earlier sex maturity and earlier cessation of growth, and this moderated development of bone and muscle, and probably neither the mode of life nor the average diet would be particularly favourable to their growth. This implies the smoothness of bone and feature which is often found in the Mediterranean type, though one sees survivors with the earlier characters like the strong supraciliaries. The filling out of the skull and its vaulting are not so marked as in a good specimen of the Nordic type. The nose is moderate and variable but narrower than in the older types, though not so large or, usually, so narrow as in the Nordic peoples. The contrast between the moderate nose of the Western Mediterranean and the large nose of the Semite is probably interestingly linked with climatic differences.

The eyes and hair are dark, and grade towards the curly, but pigment varies a good deal and is naturally less marked in the cooler hill regions, though it may be strong among survivors of types with the other early characters. Slight infusions from Africa from the days of our early skulls onwards have doubtless influenced the race types to some extent.

France and the Low Countries offer a link between the areas of characterization of the Mediterranean and Nordic types, while the British Isles are a refuge from pressure as well as a goal of migration just off the flank of that link-line.

### *French and British Long-Heads.*

France is the classic region for the study of Palæolithic man, and there can be little doubt that increasingly morphological studies of type among her present population will reveal survivals of many ancient types with location that have a good deal of scientific interest. One gets a useful, if rough, idea of the distribution of open spaces in antiquity from the maps of the distribution of megaliths<sup>1</sup> and the catalogues of those monuments,<sup>2</sup> and it is specially interesting to link them on to the map of loess, and related deposits and forest areas, given by Vidal de la Blache.<sup>3</sup> The essential zone is that leading along the south-west side of the Central Plateau from Narbonne to Brittany, and this is in part coincident with the areas of occupation of the late Palæolithic (see maps in the works by Bertrand and Schrader just cited). In later times several parts of this zone have been regions of poverty, regions exporting

<sup>1</sup> See Schrader, F., *Atlas Historique*, 1907, map 11, No. 1. Bertrand, A., *Nos Origines—La Gaule avant les Gaulois*, 1891, opposite p. 128.

<sup>2</sup> See Déchelette, J., *Manuel d'Archéologie*, vol. 1, p. 373 ff.

<sup>3</sup> Vidal de la Blache, P., *Tableau de la géographie de la France*, map opposite p. 70.



the more enterprising elements of their population, so it is natural that they should show these survivals. In Collignon's work on the Dordogne (quoted page 17) he claims to show that there are distinct survivals of the Cro-Magnon type among the dark dolichocephals of the Isle valley, and that, as above stated, there are also individuals with the very different characters under special review in this article. These valleys, therefore, below the south-west edge of the Central Plateau are proven regions of survival. Dark dolichocephals, according to him, are also present in several other parts of France, notably in Brittany.<sup>1</sup> He also<sup>2</sup> finds them in the Bordelais, and notes here their tall stature, large narrow nose, dark colouring and so on, and he supposes these are "Cro-Magnons" modified by admixture. There are also many of the average dark Neolithic type,<sup>3</sup> persons, that is, with the ordinary Mediterranean characters, face long, regular, narrow, without projecting zygomas, fairly long nose which is not very narrow—all these being added to the usual brown colouring and long-headedness. In other words, careful morphological survey of the peoples along the zone Narbonne-Brittany would reveal the various stages of grading between the chief Palæolithic types of dolichocephals and later ones, and notably the one usually called Mediterranean.

The variants of the dark dolichocephals found in Wales were one main subject of an earlier study<sup>4</sup> already frequently quoted, and it thus seems unnecessary to go into details again here. In the early part of this paper were listed individuals possessing the associated characters under discussion, and there is no doubt of the occurrence of such individuals in other parts of the British Isles, and notably in Ireland. The occurrence of tall, dark dolichocephals in Denbighshire was discussed in the paper just quoted, and they are an element of the population of the Scottish Highlands too. Again, we have in South Wales and elsewhere many examples of the Mediterranean type, less dark perhaps than their more southerly brethren. The dark dolichocephals of France and the west of the British Isles thus show many resemblances one to the other, but they are a more important element in the British Isles than in France: the British Isles, or rather their western regions, are in a higher degree a refuge of old types. They are for the most part not so dark as the ordinary Mediterraneans, and they are less strongly built and have less finely vaulted skulls than the Nord. One possible view would be that they represent a cross between the two, but if we think of these two types as products of distinctive evolution, in distinct areas of characterization, from the various older dolichocephals, we may be allowed to think of many of our British and Irish long-heads as due not so much to crossing of fully

<sup>1</sup> Collignon, R., "L'Anthropologie au conseil de revision." *Bull. Soc. Anthr.*, Ser. iv, t. i, No. 4, 1890, pp. 736 ff.

<sup>2</sup> Collignon, R., "Anthropologie du sud-ouest de la France," *Mem. Soc. Anthr. Paris*, Ser. 3, t. i, No. 4, 1895, p. 104.

<sup>3</sup> *Ibid.*, p. 106.

<sup>4</sup> Fleure, H. J., and James, T. C., "Geographical Distribution of Anthropological Types in Wales," *Journ. Roy. Anthropol. Inst.*, xlii, 1916.



differentiated Nords and Mediterraneans as to representatives of types whence these races evolved, no doubt representatives showing various modifications. The intermediate character of our climate and circumstances as compared with those of the Baltic and the West Mediterranean regions, added to the insular character of our region and its remoteness under the conditions of antiquity (in spite of the importance of Bronze Age Ireland) makes this view still more probable.

#### GENERAL CONCLUSION.

As the breeds of man are fertile *inter se* to some extent at least, they cannot be studied in quite the same way as the species of animals which once evolved remain distinct from pre-existing ones and are, often at least, sterile when crossed with the latter.

The study of heredity has shown that when two breeds are crossed the offspring may follow one or other parent in respect of any character, *i.e.*, there need not be a blend in any one character. It is thus possible for us to inherit different characters from different sources, and even from divergent human breeds. This emphasizes the importance of getting behind our race-types for certain purposes, and of studying individual characters or groups of characters found associated together in many cases.

A group of characters A may be associated with groups (of characters) B and C in one set of people in a certain region, with groups (of characters) D and E in another set of people in another region, and so on. To discuss whether A+B+C is to be called the same type, or a variant of the same type as A+D+E is not the most profitable way to attack the problem. The essential fact is that a group of characters A has somehow been transmitted to the two sets of people. It is suggested that the conscious adoption of this line of thought by anthropologists would make unreal several of the perplexities about race classification, and the author thinks he is right in saying that some idea of this kind underlies much of the fine work of Giuffrida-Ruggeri in particular.

In this paper the attempt has been made to study, both morphologically and geographically, a group of associated characters (*see* list on page 15). It is found that they occur on the Plynlymon moorland and elsewhere in Wales, in Ireland, in France, in the Iberian peninsula, in Sardinia, in North and East Africa, among the Australians, in Fiji, and in East Brazil. The other characters associated with them may, and do, vary considerably from region to region. These characters are shown to have occurred among Palæolithic men (*see* list, pages 19-20) and the view is taken that we are dealing, in the modern populations, with survivals of a group of characters of high antiquity among peoples whose other characters vary too much for us to be able to speak of a common type. The possibility of some characters being outward and visible effects of changes of internal secretions and the like is borne in mind, but no speculations on this point are ventured. They would be irrelevant here.



It is noted that these survivals occur around the fringes of Eurasia and in the parts of America most remote from the pressure of immigrants from Asia. A map of the more or less open spaces above and around the forests in South America would bring this last point out very clearly.

A parallel study of survivals of Cro-Magnon and other ancient "grouped-characters" would probably be made, and Collignon and others have made suggestions on this point.

Granting the occurrence of a fairly early post-glacial spread of long-headed men, in all probability of several varieties, including "Combe Capelle," "Cro-Magnon," and others, we are able to picture to some extent the further evolution of characters in certain regions. The Baltic and West Mediterranean are chosen for special consideration because what are considered to be distinctive racial or sub-racial types are associated with these regions. The thought is pursued in this paper that the types in question show certain characters, evoked in the long run by environmental considerations, modifying various early forms of long-headedness and associated characters. The skulls, probably of Aurignacian date, listed on pages 19-20, are grouped together, with the Grimaldi Africanoid as a variant. The Cro-Magnon skulls and one skull from the Grotte des Enfants (Grimaldi) are probably another type. The Barma Grande (Aurig.) and Obercassel (Magd.) skulls suggest mosaics of these two groups. The Chancelade suggests intensification of some of our grouped characters and modification of others.

Skulls from Laugerie Basse, Sorde, Placard and Bruniquel, all Magdalenian or later, suggest modifications from our grouped characters towards the Mediterranean type, while several of the skulls from Solutré trend towards the Nordic type.

Skulls of dates undoubtedly later than the Palæolithic are discussed in the preceding pages in so far as they suggest survival of our grouped characters.

Britain, as a region of refuge lying off the zone intermediate in position and in character between the Nordic and West Mediterranean areas of characterization, is supposed to show amongst its long-heads:—

(a) Survivals of the old characters—"Combe Capelle" and probably Cro-Magnon, etc.

(b) Nordic immigrants.

(c) Mediterranean immigrants.

(d) Survivals of individuals who have not definite Nord or Mediterranean blood in their ancestry, but represent descendants of people evolving from the stage (a) above to stage (b) or possibly (c).

(e) Doubtless some mixtures of (b) and (c).

This is, of course, in addition to broad-headed elements, for which see *inter alia* the earlier paper on Welsh people already quoted.



## LEOPARD-MEN IN THE NAGA HILLS.

By J. H. HUTTON, I.C.S.

IN speaking of leopard-men I should like first of all to make it clear that I have taken the word leopard as the translation of the Naga words, because it is usually the leopard that is associated with Naga lycanthropists. The tiger, however, is also so associated, as well as one or perhaps more of the smaller cats. For all of these animals there is a generic term in most Naga languages, and when a Sema Naga, for instance, speaks of *angshu* he may mean a leopard or a tiger, between which he makes no clear distinction, or even a smaller animal such as a clouded leopard, a caracal, or the golden cat. The same applies to the Angami Naga word *tekhu*. On the other hand the Chang Nagas have distinct words, and speak of a tiger as *saonyu*, regarding the leopard, *khönkhü*, as little less inconsiderable than a civet cat, *khü*.

All Naga tribes seem to regard the ultimate ancestry of man and the tiger (or leopard) as very intimately associated. The Angamis relate that in the beginning the first spirit, the first tiger, and the first man, were three sons of one mother, but whereas the man and the spirit looked after their mother with the greatest tenderness, the tiger was always snarling about the house giving trouble. Moreover, he ate his food raw, while the man ate his cooked, and the spirit his smoke-dried. At last the mother got tired of family squabbles, so put up a mark in the jungle and told the man and the tiger to run to it, the one that touched it first being destined to live in villages, and the other to live in the forest and jungle. By arrangement between the spirit and the man, the former shot an arrow at the mark while the other two were racing, and the man cried out that he had touched it. The tiger arrived while it still trembled from the blow, and being deceived went away angry to live in the jungle.

After this the man sent the cat to ask the tiger, when he killed a deer, to leave him a leg on the village wall, in virtue of their brotherhood. The cat got the message wrong and told the tiger to leave all the deer he killed, which started hostility between the man and the tiger. This story is found in a more or less identical form among the Angami, Sema, Lhota, and Rengma Naga tribes, the Sema making the tiger search for the corpse of his dead mother to eat it.

Man and the tiger are, however, still regarded as brothers, and if an Angami kills a tiger he says "the gods have killed a tiger in the jungle" and never "I have killed a tiger," while the priest of the village proclaims a day of abstention from work "on account of the death of an elder brother."



After killing a tiger or leopard the Angami wedges the mouth open with a stick and puts the head into running water, so that if the animal tries to tell the spirits the name of the man who killed him, all that can be heard is an inarticulate gurgling in the water. The Sema puts a stone, as well as a wedge, into the mouth to prevent the tiger lying in wait for him after death and devouring him on their way to the abode of the dead, while he also becomes entitled to wear a collar of boar's tusks, the insignia of a successful warrior, as though he had killed a man.

In some tribes whole clans are associated with the tiger; thus among the Changs the whole Hagiya Sept of the Chongpu clan is in some vague way intimately connected with tigers (not in this case with leopards) and is apparently of lycanthropic tendencies. At the same time it is taboo for all true Changs to touch tigers at all, far more to combine, as men of other tribes do, to hunt them. If a Chang meet a tiger in the jungle he will warn it to get out of the way before throwing a spear or shooting at it. Should he kill one he is under a taboo for thirty days, and treats the head in the same way as an Angami, putting it with its mouth wedged open under falling water.

The Chang will eat leopard flesh, but not of course that of the tiger. The Sema will eat neither, the Angami both—but it must be cooked outside the house.

When it comes to the practice of lycanthropy we find that the Angami Nagas, though believing that the practice exists and can be acquired, do not indulge in it themselves. Like other tribes they believe in a village far to the east peopled solely by lycanthropists, a belief which is perhaps based on the claims of some clan like the Chongpu-Hagiya of the Changs, in which all members of the community are believed to possess this faculty of taking tiger or other forms in a greater or less degree. But the Angami also believe in the existence of a spring, by some said to be of blood, or of reddish-coloured water, from which whoso drinks becomes a lycanthropist. They believe that the people of the neighbourhood know and shun this spring, but that the danger to strangers is great. Moreover, when the children of that neighbourhood are peevish, it is customary, they say, to dip a blade of thatching-grass into the spring and give it to the child to suck. It stops his wailings, but he grows up a were-tiger. The Angami, however, does not practise lycanthropy himself, and the only Angami villages in which persons who do practise it are found, are those on the borders of the Sema country, where a large part of the population is Sema by origin. The Sema is an inveterate lycanthropist, and it is in that tribe that specific examples are the easiest to come by.

Both the Angami and Sema agree in holding that there is no actual transformation of the body of the lycanthropist into a leopard. What he seems to do is to project his soul into a particular animal with which his human body also thus becomes very intimately associated. A leopard which is thus the recipient (from time to time) of a human soul may be recognized by having five claws on each foot, and is called by the Angami *mavi* (which might mean "real man") and by the Semas



*angshu amiki*, an expression to which I will refer again. I have myself seen a leopard with dew-claws (making five instead of the usual four) killed in a Rengma village and at once asserted to be the recipient of a lycanthropist's projected soul. Incidentally I have seen and followed in the soft bed of the Dayang River the tracks of a freak tiger which had apparently five toes on its fore-feet.

The lycanthropic spring in which the Angami believe is sometimes said to be situated in the Sema country, but the Semas give an entirely different account of the way in which they acquire the lycanthropic habit.

The theory and symptoms are clear and recognizable, and differ perhaps from most lycanthropists in other parts of the world. The Sema undergoes no physical transformation whatever. The "possession," if we may term it so, is not ordinarily induced by any external aid, but comes on at the bidding of spirits which may not be gainsaid, and under whose influence the man possessed entirely loses his own volition in the matter. The faculty can, however, be acquired by very close and intimate association with some lycanthropist, sleeping in the same bed with him, eating from the same dish with him, and never leaving his side for a considerable period—two months is said to be the shortest time in which the faculty can be acquired in this way. It can also be acquired, according to some, by being fed by a lycanthropist with chicken-flesh and ginger, which is given in successive collections of six, five, and three pieces of each together on crossed pieces of plantain leaf. It is dangerous, too, to eat food or drink that a lycanthropist has left unfinished, as the habit may thus be unwittingly acquired. The animal whose body the lycanthropist makes use of, though sometimes the tiger proper (*abolangshu*), is usually a leopard and is known as *angshu amiki*, a word which is said to be derived from the verb *kemiki*, meaning to wander alone in the jungle for days together, since men who do this are most liable to the possession. It may be observed, however, that the root *miki* also means "to bite."<sup>1</sup> Cowardly and worthless men, if they acquire the habit, make use of the body of a red cat (*angshu akinu*, probably = *Felis aurata*, the golden cat). The habit is very far from desired. No one wants to be possessed by the habit, and it is, on the contrary, feared as a source of danger and a great weariness to the flesh.

The soul usually enters into the leopard during sleep and returns to the human body with daylight, but it may remain in the leopard for several days at a time, in which case the human body, though conscious, is lethargic. It (i.e., the human body) goes to the fields and follows the usual routine of life, but is not able to communicate intelligibly, or at any rate intelligently, with other persons until the possession expires for the time being. The soul, however, is more or less conscious of its experiences in leopard form and can to some extent remember and relate them when it has returned to its human consciousness. During sleep the soul is the leopard

<sup>1</sup> Incidentally, it also means "to tell lies."



with its full faculties, but when the human body is wide awake the soul is only semi-consciously, if at all, aware of its doings as a leopard, unless under the influence of some violent emotion experienced by the leopard.

The possession is accompanied by very severe pains and swellings in the knees, elbows and small of the back in the human body, both during and consequent on the possession. These pains are said to be such as would result from far and continuous marching or from remaining long periods in an unaccustomed position. During sleep at the time of possession the limbs move convulsively, as the legs of a dog move when it is dreaming. A were-leopard of the Tizu Valley, in a paroxysm at such a time, bit one of his wife's breasts off. When the leopard is being hunted by men, the human body behaves like a lunatic, leaping and throwing itself about in its efforts to escape. Under these circumstances the relatives of the were-leopard feed him up with ginger as fast as possible in order to make him more active, so that the leopard-body, on which his life depends, may have the agility to escape its pursuers.

Were-leopards are particularly liable to possession between the expiry of the old and the rising of the new moon. Those possessed are liable to a special sort of disease which is believed to attack tigers and leopards generally, but no human beings except were-leopards. When the leopard is wounded, corresponding wounds appear upon the human body of the were-leopard, usually in the form of boils, and when the leopard is killed the human body dies also. It is, however, possible apparently for the soul to throw off the possession permanently as old age is approached. The father of Inato, Chief of Lumitsami, got rid of the habit by touching the flesh of a leopard. The village had killed one and he carried home the head. After that, he explained, he could no longer associate with the leopard kind. It is generally held, and doubtless not without some substratum of truth, that a man under the influence of the possession can be quieted by feeding him with chicken dung. Probably this produces nausea.

Possession is not confined to men. Women also become were-leopards and are far more destructive as such than men are. Of men, those who have taken heads are most dangerous, and are believed to kill as many men as leopards or tigers as they have done as warriors.

The actions of the leopard's body and of the human body of the were-leopard are closely associated. As has been noticed, if the human limbs are confined the leopard's freedom of action is restricted, and troublesome were-leopards are said to be sometimes destroyed in this way.

On one occasion the elders of a large Ao village (Ungma) came to me for permission to tie up a certain man in the village, while they hunted a leopard which had been giving a great deal of trouble. The man in question, who was, by the way, a Christian convert, also appeared to protest against the action of the village elders. He said that he was very sorry that he was a were-leopard; he did not want to be



one, and it was not his fault, but seeing that he was one, he supposed that his leopard body must kill to eat, and if it did not, both the leopard and himself would die. He said that if he were tied up the leopard would certainly be killed and he would die. To tie him up and hunt the leopard was, he said, sheer murder. In the end I gave leave to the elders to tie the man up and hunt the leopard, but told them that if the man died as a result of their killing the leopard, whoever had speared the leopard would of course be tried, and no doubt hanged, for murder, and the elders committed for abetment of the same. On this the elders unanimously refused to take advantage of my permission to tie up the man. I was sorry for this, though I had foreseen it, as it would have been an interesting experiment.

My information as to were-leopards was obtained directly either from were-leopards themselves or their relatives, friends, and chiefs. Unfortunately I have not so far succeeded in seeing a man actually at the moment of possession. I have had the marks of wounds shown me by men who claim that they were the result of wounds inflicted on their leopard bodies. Kiyezu of Nikoto, now Chief of Kiyezu-Nagami, who used to be a were-leopard in his youth, can show the marks on the front and the back of his leg above the knee where he had been shot, as a leopard, long ago by a sepoy of the Military Police outpost at Wokha with a Martini rifle. The marks, in corresponding positions on the front and back of the thigh, looked like marks caused by bad boils. Zukiya of Kolhopu village showed me fairly fresh marks about his waist which he said were two months old, and caused by shot which had hit his leopard body, and the marks looked as though they might have been caused by shot. Ghokwi, the Chief of Zukiya's village, said that Zukiya was in the habit of pointing out the remains of pigs and dogs killed by him in leopard form, so that their owners might gather up what remained. He said that he had a quarrel with his own brother, one of whose pigs he had killed and eaten by accident. Ghokwi mentioned the names of various people whose animals Zukiya had killed and eaten.<sup>1</sup> Sakhuto, Chief of Khuivi, showed a wound in his back which was quite new on March 1st, 1913, which he said was the result of some one having shot at him when he was in leopard form a few days before. The wound in the human body does not, under such circumstances, appear at once. It affects the same place in the human body as the original wound did the leopard, but takes several days to appear.

In March, 1919, an Angami interpreter, Resopu of Cheswezuma, at that time working with me in camp, wounded a large tiger near Melomi. Three or four days later the Head Interpreter of the Deputy-Commissioner's staff, a very well-known, highly intelligent and reliable man, Nihu of Kohima, happened to meet a sick Sema road *muharrir*, Saiyi of Zumethi, being carried home. The man, who was employed near Melomi, complained of having had an accident, but on being pressed several

<sup>1</sup> According to some a were-leopard who kills cattle may be found in the morning to have bits of their flesh sticking to his teeth.



times for details, admitted that he had no external injury that could be seen, but was suffering from the effects of the wounds inflicted by Resopu on his tiger form, having very severe pains in his neck or shoulder and abdomen and being haunted by the horrid smell of rotting flesh.

I have known personally a large number of Semas who are, or claim to be, were-leopards or were-tigers. The Headman of Chipoketami is one; Chekiye, Chief of Aichi-Sagami, is another; Inaho, Chief of Melahomi, a man of great physical strength and endurance, is perhaps the most notorious. Gwovishe of Tsukohōmi and his daughter Sukheli were only known to me by repute, Gwovishe's son Chekiye of Lukammi more intimately. Kusheli of Litsammi, a second woman were-leopard, has her home inside the frontier, and has a most unenviable reputation. The Sakhuto above mentioned died on July 19th, 1916, as a result of the leopard which was occupied by his projected soul<sup>1</sup> having been shot by Sakhalu of Sakhalu on June 30th of that year. It was reported to the writer on July 4th that Sakhalu had shot a were-leopard, but it was then believed to be identical with one Khozhumo of Kukishe, and it was expected that he would die when the news reached him, as the death of the man concerned does not actually take place till he hears that his leopard body has been killed. It was, however, Sakhuto who claimed the leopard and who had the honour of dying to prove his claim. The son of Yemithi of Lizotomi, whose leopard-cat body was killed at Sagami, heard the news as he was returning to his village and expired on the spot for no other reason—a curious example of the power of the Sema mind over the Sema body.

Both Inato of Lumitsami and Inaho of Melahomi related to me independently how, when they were going up together from Pusumi to Lotesami, Inato managed to persuade Inaho to show his tiger form. The latter lingered for a moment behind, and suddenly a huge tiger jumped out on the path in front of Inato with a roar and an angry waving of his tail. In a flash Inato had raised his gun, but the tiger-Inaho jumped in time to avoid the shot, and disappeared. Since this Inaho has had an excellent excuse for refusing to show his tiger form to anyone at all.

It is also told of Kusheli of Litsammi that she cured her husband of making sceptical and impertinent references to her lycanthropic peregrinations by appearing before him in leopard form. His name is Yemunga and he was returning from a business deal in Chatongbung when suddenly he saw a leopard blocking the path. Guessing it was his wife he laughed at it and told it to go away. It went on and blocked the path a little further ahead. This time he threatened to spear it, and it slid off into the jungle, only to reappear behind him unexpectedly with a sudden growl. This frightened him, and he ran home as fast as he could, the leopard pursuing till near the village, where it disappeared. When he entered his house his wife at once started to mock him, asking why he was perspiring so and whether he had seen a leopard.

<sup>1</sup> The Sema word is *aghongu*, which primarily = "shadow," but is used normally in Sema eschatology for the soul of a dead person.



The Sema were-tiger, or reputed were-tiger, with whom I was best acquainted was Chekiye, Chief of Lukammi and a son of the famous Chief Gwovishe of Tsükohömi. He would never admit to me that he was a lycanthropist, but none of his Sema acquaintances ever doubted but that his reputation was well deserved.<sup>1</sup> He came nearest to admitting to me that he was a were-tiger on the occasion of a tiger hunt in which I took part at Mokochung on March 29th, 1916. Ungma village ringed some tigers—there were certainly two full-grown animals and two three-quarter-grown cubs present. The old tiger himself broke out early in the beat, mauling a man on his way; shortly after which Chekiye turned up, armed with a spear, but no shield. The tigress broke near him and came within a few feet of him, bit and mauled his next-door neighbour and went in again. Chekiye, when remonstrated with for having stood quietly by and not having speared the animal, said: "I did not like to spear her as I thought she was probably a friend of mine." After the beat he stated that the tigress killed was a woman of Murromi, a transfrontier village in unexplored country where all the population are said to be were-tigers. He also explained that the tiger in a beat was really far more frightened than even the hunters themselves, which is probably true enough, and shrewdly observed that the use of the tail, which is stiffened up and out behind and swayed at the end from side to side, is to make the grass wave *behind* the moving tiger, so that the position of the tiger's body is mistaken and the aim disturbed accordingly, an observation which seems to be at least true of the result of the waving tail. It was reported that he claimed in private to be identical with the tiger that first escaped, but he would not admit this to me, and there was indeed another and more likely candidate to this rather doubtful honour. This was an Ao named Imtong-lippa of Changki. While this beat was going on three miles away, he was behaving like a lunatic in the house of one of the hospital servants at Mokochung. During his possession he identified himself with one of the tigers being hunted and stated that one of them was wounded and speared; that he himself was hit with a stick (the Ao method of beating entailed the throwing of sticks and stones and abuse incessantly to make the tiger come out). He laid a rolled mat to represent a fence and six times leapt across it. He ate ginger and drank a whole bamboo "chungu" (about a bucketful) of water, after which he said that he had escaped with two other tigers after crossing a stream, and was hiding in a hole, but that one tigress, a trans-frontier woman, had been speared in the side (in point of fact she was speared in the neck) and had been left behind and would die. (We shot the tigress in the end.) He said there were four tigers surrounded. Chekiye said six. Four actually were seen, however, two grown and two half- or three-quarters grown. There *may* have been others, but it is not very likely. Some sixteen cattle had been killed in two days. This account I took down after returning from the beat, on the same day,

He was, however, once caught out in a pure and demonstrable romance by one of my Sema interpreters.



from an eye-witness of Intong-lippa's exhibition, which was seen and watched by a large number of men both reliable and otherwise in their accounts of it.

I have given these details as they show clearly the Naga beliefs on the subject. Of course among the Semas the idea of what one might describe as the projectability of the soul is very pronounced. It is a common thing for a sick person to ascribe his sickness to the absence of his soul from his body, and under such circumstances he takes food and drink and goes to the field or any other places where he thinks his soul has got left behind and summons it, calling it, of course, by his own name. When it has arrived he comes slowly home, bringing his soul behind him. A case once came up before me for adjudication in which an old man named Nikiye, who had been ill for some time, went to the fields to call his soul. It came, and he was climbing slowly back to the village occasionally calling "Nikiye, Nikiye!" over his shoulder to make sure that the truant soul was following. Unfortunately a personal enemy had observed him, and lay in wait in the bush by the path with a thick stick. As the old man tottered by he sprang from his ambush with a yell, and brought down his stick with a thud on the path immediately behind Nikiye's heels. The frightened soul fled incontinently, and the old fellow himself died of the loss of it two days later. To avoid losing the soul a Sema, who makes a temporary shelter away from home, always burns it on leaving it, lest his soul, having taken a fancy to it, should stray back there by itself.

To return to lycanthropy in particular, the practice described, as distinct from the belief, seems particularly associated in Assam with the immigration from the North-West—that is, from the direction of Nepal and Thibet. The Changs probably have an admixture of Singpho blood, and the Singphos are known to have come from that direction; so, too, the Kacharis who, like the Changs, have a clan of tiger men, and call it the *Mosa-aroi*, and the Meches who have a corresponding clan called *Masha-aroi*, which also goes into mourning for the death of a tiger—both came from the north of the Brahmaputra. Among the Garos also the practice is found, and they too came from the same direction. On the other hand the Khasis, who seem to belong to a different stock—perhaps to the Kol-Mon-Annam race, and to have come from the east—say they believe in the existence of tiger men, but appear to have absorbed the idea from the Garos, who are their neighbours, and not to have possessed it as an indigenous idea, nor to indulge in, or believe that they indulge in, the practice themselves. The Angami, who also does not practise lycanthropy, again seem to have immigrated into the Naga Hills from the south-east and to be intimately connected with the Bontoc and Igorot of Luzon in the Philippines. In other ways, however, particularly in language, the Sema is connected with the Angami, though on the other hand there are points of culture which keep suggesting a connection between the Sema and the Garo. One of them is the use of Y-shaped posts to celebrate feasts given to the village, similar wooden posts being used by the Garo, though he is at present entirely isolated from the Sema, while the Kachari ruins



at Dimapur contain the same bifurcated monuments in stone. Perhaps the explanation is that the present Sema tribe is the result of the amalgamation of a small Angami element which has imposed itself upon another stock, a process which the Sema tribe itself is still carrying on with regard to its neighbours to the east at a very rapid rate, a Sema chief or adventurer grafting himself and a few followers on to a Sangtam or Yachungr village; this in a generation or less becomes entirely Sema in language and polity, though no doubt retaining its former beliefs and certainly retaining much of its former ceremonial.

The theory that this form of lycanthropy comes from a northern source is perhaps supported by the fact that the form which the belief takes in Burma and Malay, as well as in the plains of India, seems to turn on an actual metamorphosis of the body. Mr. Grant-Brown, writing in the Institute's *Journal* in 1911 about the Tamans, a tribe of Chinese origin in the Upper Chindwin Valley, notes that they transform themselves into tigers by making water and then rolling naked on the earth they have wetted.

A nearer approach to the Naga belief appears to exist in Malay, but here again actual metamorphosis seems to be essential to that form of lycanthropy. Mr. O'May, writing in *Folklore* in 1910 (Vol. XXI, p. 371) says that in Burma and Sumatra a quite ordinary man may turn into a tiger in the evening without any fuss, and he goes on to describe a Malay game of turning into a civet cat, in which a boy is actually hypnotized and caused to behave like a civet cat, becoming (as the Naga were-leopard does) much exhausted when the trance is over. So, too, Skeat mentions the case of one Haji 'Abdallah caught naked in a tiger trap in Korinchi State in Sumatra (*Malay Magic*, p. 160-163), while Messrs. Skeat and Blagden note that the were-tigers of the Malay Peninsula (most unlike the Nagas, here) cannot be shot in their metamorphosed condition (*Pagan Races of the Malay Peninsula*, p. 227).

Skeat also records the inverse of the Naga case, in the process by which a possession of the human body by a tiger spirit is invoked to cast out another and less powerful possessing spirit (*Malay Magic*, p. 436), and similarly (p. 455) the induction of a monkey spirit into a girl who, while thus possessed, is capable of the most remarkable climbing feats.

In all these cases, however, the practice differs from that of the Nagas in that either metamorphosis takes place, or it is the animal spirit which possesses the human body, not the other way round. For with the Naga were-leopard the soul is merely projected into the body of the animal, while no metamorphosis of the human body takes place nor is any sort of hypnotism employed—unless, indeed, it be self-hypnotism, and involuntary at that.

Sir James Frazer (*G.B.*, Vol. XI, p. 196) gives instances from Asia of the location of the external soul in animals for the purposes of ensuring its safety or for enhancing the power of the magician. Neither of these two motives appears to influence the Naga were-wolf in any way. It is recognized on all hands that the practice is a dangerous one, and it is said to be rapidly decreasing owing to the increased number



of guns in the district, which make it still more dangerous than it was. Lycanthropy is not practised by wizards, as were-tigers are, as far as I know, invariably ordinary men who do not claim to supernatural powers of any sort. The nearest parallels seem to come from Africa, and Sir James Frazer mentions several beliefs from Nigeria which resemble the Naga belief pretty closely. One other point may be added. In some cases lycanthropy among Nagas seems to be hereditary, or perhaps rather one should say that a tendency towards it may be inherited, as in the case of many diseases; and indeed Mr. Baring-Gould<sup>1</sup> described lycanthropy as a disease, associating it in this respect with the mania for cattle-maiming and with a morbid desire to devour human corpses. Cases of both of these I have met with in the Naga Hills, the latter, however, being regarded by the Nagas themselves as symptomatic of extreme insanity; whereas the former is, like lycanthropy, merely a vice which is liable to be very troublesome to the neighbours of those that practise it.<sup>2</sup>

*Note on Ao Naga belief as to a certain form of relationship between men and leopards.*—One Longrizibba of Yongimsen village was haunted by a leopard which very frequently came at night and slept outside his house close to that place by the wall nearest which Longrizibba himself was sleeping inside. Whenever the leopard came, Longrizibba fell into a deep sleep and could not be aroused by his wife, even though he had previously sharpened his spear with a view to killing the animal. Then he took to sleeping on the platform at the back of his house, when the leopard took to sleeping underneath. On one occasion water was poured on to it, but without discouraging it.

After this and other efforts to get rid of it, Longrizibba induced the leopard to leave him alone by the sacrifice of a dog. This took place in 1919 when I was on leave, and my attention was drawn to the case by Mr. Mills, Subdivisional Officer of Mokokchung, one of whose interpreters saw the leopard outside the house at night.

Apparently such associations of men with leopards are, according to the Ao tribe, fairly frequent. The relations between the man and the leopard are normally quite friendly and mutually harmless until on an appointed day they are brought to an end by the leopards devouring the man.

If the haunting is caused by some ceremonial fault on the man's part, it can be ended by a ceremony which includes the surrender of a cloth, a dao sling and a piece of the man's own hair. If, however, the relationship dates from a man's infancy and has no cause that can be specified, he is unable to break off the relationship.

A mountain with twin-peaks is pointed out by Ao as a meeting place of tiger-men.

<sup>1</sup> *Book of Were-Wolves.*

<sup>2</sup> Professor Elliot Smith tells me that Egyptian boys practise lycanthropy in association with the forms of the common cat. A bibliography on the subject of lycanthropy will be found at the end of Mr. McLennan's article in the ninth edition of the *Encyclopædia Britannica*, but it relates almost entirely to the European races.



The practice of surrendering to the leopard a piece of the haunted man's hair is paralleled in the Chang tribe by the practice, when a man loses himself in the forest, of cutting off a little hair and putting it in the fork of a tree for the rock python which is believed to have caused him to lose himself. After this the lost man is able to find his way home. Semas under similar conditions cut a piece off the fringe of their cloth instead of their hair.

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Colonel SHAKESPEAR, C.M.G., D.S.O., who was unable to be present at the reading of this paper, sends the following observations :—

Although I have a fairly extensive knowledge of the tribes living in the hills of Manipur, which adjoin those dealt with by the author, and a better knowledge of the Lushais living further to the south, I have never come across the type of lycanthropy described by Mr. Hutton. I have never met anyone who admitted being, or was known to be, a man tiger. In all the tales I have heard from natives of those hills and also from Gurkhas, it has always been a case of metamorphosis. The idea of soul projection is, however, found among the Lushais, I have described it in *The Lushei Kuki Clans*, pp. 111, 112. There the spirit or *Khawhring* is an unsought and generally unwelcome guest in a woman's body, whence it issues forth and takes possession of other women and the possession is infectious and hereditary ; in these particulars there is a resemblance to the Sema form of lycanthropy. The idea that the soul and body can be separated without death ensuing at once is common to many tribes in these hills. Among the Aimol, the priest, after a child's birth, summons the soul to take possession of its new dwelling, the child's body. Among the Lushais the father and mother keep quiet for seven days after a child's birth, for fear of injuring the little one's soul, which is thought to hover and perch like a bird on their bodies and clothes. The Lushai also have the belief that a man may temporarily lose his soul, and that the wanderer may be called back by the performance of the proper ceremony.

The mention of the Y-shaped posts erected to commemorate feasts given to the villagers reminds me of the posts seen in Khawtlang villages, as shown opposite page 65, *Lushei Kuki Clans*, which are put up for the same purpose.

16822



## ASHANTI AND BAULE GOLD WEIGHTS.

By N. W. THOMAS, M.A.

WEST AFRICA is known to have been a source of gold in classical times, and even if it is more probable that the Carthaginians drew their supplies from the Senegal hinterland, it is by no means unlikely that the Gold Coast was more than two thousand years ago producing surface gold, as it does to-day. In the early records there is some mention of metal pieces of gold (mixed with alloy), but this may well have been due to European influence. In the ordinary way the native currency, if the term can be used, consisted of gold dust; so much was this the case that we have accounts of the method adopted to reduce nuggets to dust. The object of this was to make the precious metal readily divisible; in order to deal with it in its finely divided state a great number of weights were in use among the natives, specimens of which are to be seen in many European museums. Singularly enough, though these collections go back in some cases at least as far as the early days of the nineteenth century, if not earlier, the subject of Ashanti gold weights was not dealt with, exhaustively or otherwise, till 1912, when Prof. Zeller, now Director of the Ethnographical Section of the Bern Historisches Museum, published a comprehensive work, in which he not only referred to the collections at Bern, Leiden, Köln, Paris, Berlin, etc., but also noticed some of the earlier literature (Bibl., No. 2).

By an unfortunate accident Prof. Zeller overlooked an important account of Baule gold weights to be found in a linguistic work by M. Delafosse (Bibl., No. 11); the name for the Baule unit of weight is the same as that used in Ashanti and Akem, but the actual weight is only two-thirds of the Ashanti value. The Baule names correspond in part to those of Ashanti, but the series is in some respects less systematic than that in use in Akem and Ashanti. If Prof. Zeller had been in possession of the lists and values of the Baule weights, it seems probable that he would have felt serious doubts as to his conclusions, which imply a degree of systematization and mathematical powers on the part of those who invented the Ashanti series, far more considerable than we have any warrant for attributing to any negro tribe uninfluenced by European culture.

Stated briefly, Prof. Zeller's contention is that the weights can be arranged in groups, each of which has as its starting point an uneven number of the unit, which is known as *taku*, i.e., three, five, seven, and so on, up to thirteen. Thus Group II starts with half a *taku* and proceeds in geometrical progression, with a few gaps, up to the *benna* with a weight of 256 *ntaku*; Group III begins with 3 *ntaku* and terminates with 384; or, if we include the names given by Müller (No. 18) two



and a half centuries ago, up to 3072 *ntaku*, 24 oz. of gold. Group VI starts with 9 *ntaku* and proceeds like those already mentioned on a geometrical basis with a factor of two; but as certain elements are irreconcilable and demand a factor of three, Prof. Zeller subsequently forms two sub-groups, with 216 and 360 as starting points. Even with these modifications all the weights are not included in the series; and the *agiratwefa* ( $16\frac{1}{2}$  *ntaku*) and *anamfi* (60 *ntaku*) are left unaccounted for.

Not only are there these irregularities, but the weights below the *taku*, viz., *powa*, *pesewa*, *dama* and *kokoa*, though they proceed with a factor of two, cannot be brought into the general series, as a *taku* contains 3 *dama*: the *powa* is one-twelfth of a *taku*—i.e., about one-fiftieth of a gram, or one-third of a grain.

It must not be supposed that these small weights are of late origin, for although Müller (No. 18) does not mention them, an earlier authority, P. de Marees (No. 16), one of several not quoted by Prof. Zeller, states that gold was weighed in four square pieces of a grain or half a grain, doubtless the *pesewa* and the *dama*, though the correspondence is not quite exact. The same work adds that before the arrival of the Portuguese smelting was unknown, so that in earlier days iron money stamped with the emblem of a half-moon was employed in the place of gold; this was perhaps Christaller's *nnadedworo*.

De Marees' statement appears to imply that iron smelting was known, while gold was found to be intractable; it must not, however, be taken to imply that gold was not used as currency, for the implication clearly is that the square pieces were made by the natives. Incidentally, the statement of de Marees, if it is correct, is of some importance in another direction; for it seems clear that gold smelting would certainly be known to a people that possessed the *cire perdue* method; if therefore gold smelting was in fact introduced by the Portuguese, it seems a natural corollary that they also brought with them the art of bronze casting which centres in Benin, but is also known in the Ibo and Yoruba areas. In this connection it must be remembered that the Ewe, next-door neighbours of the Agni-Twi group, are nearly related in language to the Edo of Benin, and that early records show these two peoples to have been part of a single realm before the Yoruba, by their advance to the coast, severed their communications.

It is of course true that Portuguese influence goes back a hundred years before the time at which de Marees wrote<sup>1</sup> and that more uncertain records tell us of French voyages in the fourteenth century; but this is not necessarily a ground for rejecting as devoid of foundation the tradition that gold smelting was introduced by the Portuguese.

Prof. Zeller's treatment of his printed data is in some respects peculiar; in Table II of his monograph he professes to give a list of names derived from Ramseyer's diary (No. 24), to which it was contributed by Christaller. When, however, we compare the list we find that on the one hand a number of names are

<sup>1</sup> His work appeared in 1602.



omitted (*agiratwefa*, *soansofa*, *soansu*, *nnomanu bennafa*) and their places supplied by Akem words from Christaller's *Dictionary* (No. 7), published some years later. Not only so, but one weight, altogether omitted from the list, is supplied from the same source. This is not all; for *nsano*, which is substituted for *nnomanu* (24 *ntaku*) is etymologically equivalent to 26 *ntaku* [i.e., (*buru*) *nsa-no* =  $13 \times 2$ ]. It is true that Christaller is uncertain as to its real value, and it may be only one of a number that have undergone modification in weight or value; but that clearly is not the same thing as making them interchangeable historically. It is difficult to see how Prof. Zeller's method can be justified.

His position would be more intelligible if he had consistently taken the *Dictionary* as his authority where it differed from the diary; but the words for 8 and 9 *ntaku* are taken from the diary and the *Dictionary* words are rejected; for 10 *ntaku*, a word queried by the author of the *Dictionary* is given in place of *soansofa*; and all this without a hint that the materials are being subjected to a process of sifting. What makes the whole thing more unintelligible is the fact that Christaller gives the information in his *Dictionary* in a confused form, so that it is sometimes impossible to discover whether a given weight is Akem or Ashanti. It must be remembered that in these areas the same names are used for different weights, and weights are in use in one area which are unknown in the other. The following example from the appendix to the *Dictionary* illustrates the point:—

|             |                       |     |     |     |     |    |                |
|-------------|-----------------------|-----|-----|-----|-----|----|----------------|
| Ak.         | <i>dñowasuru</i>      | ... | ... | ... | ... | 28 | <i>ntaku</i> . |
|             | <i>suru</i>           | ... | ... | ... | ... | 36 |                |
|             | <i>peresuru</i> , As. | ... | ... | ... | ... | 40 |                |
|             | <i>takimansua</i>     | ... | ... | ... | ... | 44 |                |
|             | As. <i>asia</i>       | ... | ... | ... | ... | 48 |                |
| <i>osua</i> | ...                   | ... | ... | ... | ... | 72 |                |
| Etc., etc.  |                       |     |     |     |     |    |                |

The natural inference from the tabular form is that *dñowasuru*, *suru*, and *takimansua* are Akem weights, *osua* common to both series, and *peresuru* and *asia* found in Ashanti only; but in point of fact *takimansua* and *suru* are also common to both.

If we now examine Prof. Zeller's tables we find the following discrepancies with his authorities: In Table V he inserts a ? against *tasuanu* as an Ashanti weight; *dyoa mienu ne dyoasuru* (160 *ntaku*) is omitted altogether; both are printed in the *Dictionary* in the same way as *osua* (see above) but should in point of fact be referred to Akem; *tosua* (Series VI) is noted as an Ashanti weight, though, in Table II, Burki's Akem collection is the sole authority cited. In the same series 18 *ntaku* is missing, but Prof. Zeller inserts *agiratwe* (16½ *ntaku*) though neither the actual weight nor the etymology justifies him in so doing. The word seems to mean 8 *agira*; and *agira* may be related to Müller's *eguba*, also found in the form *egwa*, where *ba* is equivalent to *taku*. In Series III *nsano* is given as equivalent to 24, though etymologically it means 26, and Christaller himself is in doubt on the subject; it seems hardly



permissible to disregard both these circumstances in the interests of a theory. The word is included a second time in Series VI.

There is another point, unconnected with the preceding one, on which the author does not seem to have fully grasped the implications of his data. His argument is that the various groups were called into existence deliberately and on mathematical principles; it is to the internal relationships of each group, not to the seriation of the whole of the weights, that attention must be directed, on this view, if we are to ascertain their origin. Now Group II (Ashanti) is made up as follows, ( ) being inserted where a weight is unknown, though it is needed to complete the series at the point in question:—

*Takufa* ( $\frac{1}{2}$  *taku*), *taku*, ( ), ( ), *borowofa* (8 *ntaku*), *borowo* (16 *ntaku*), *anamfisuru* (32 *ntaku*), *nansua* (64 *ntaku*), ( ), *benna* (256 *ntaku*).

Now it is clear that Prof. Zeller's argument depends, not on the character of the series as we know it, but on its character in the earliest ascertainable form. In giving a revised and completed list of weights in Table IV, Prof. Zeller adds such words as *eguba abiesan* (3 *egwa*) from Müller's lists, though they are clearly simple multiplicatives which do not differ from *benna anan*; he also includes a number of "half weights" like *soafa* ( $fa = \frac{1}{2}$ ). Prof. Zeller has treated these two cases as if they were material of equal value for his argument, though he is disposed to omit the "double weights" from his list of types, on the ground that they are doubles without any real existence as indicated by a distinct name; but it seems clear that if for any reason such a weight came into existence, it might easily take its name from its arithmetical relationship, even if it came into existence at the same time as the weight from which it derives its name. On the other hand it seems far less probable that a half-weight originated at the same time as the full weight—*ex hypothesi*, the half-weight is the logical derivative of the full weight—and we can hardly suppose that the latter received its name from the former. The half-weight may, of course, come to have an independent existence; but its relation to the weight to which it is intermediate is that of an afterthought; its presence, so far from supporting the theory of the origin of the series on mathematical principles, fatally vitiates the argument.

Not only therefore are there, as shown above, gaps in the geometrical series, but some of the series quoted above must as half-weights be eliminated from the conjectural original series.

If we turn to Prof. Zeller's Table III we find the following half-weights, some of them being Akem names inserted by Prof. Zeller, as described above; as, however, the Ashanti weights also exist, the argument is in this case not affected. The weights are: *soafa* (6), *fiasofa* ( $6\frac{1}{2}$ ), *As. domafa* (7), *Ak. agirawefa* (8), *Ak. domafa* (9), *Ak. bodomafa* (10), *As. bodomafa* (11), *As. dyoasuru* (28) and *Ak. dyoasuru* (32). Now there can be little doubt that, *suru* and *fa* meaning a half, the words compounded with them indicate weights later in origin than those indicated by the



words not compounded with *suru* or *fa*. Yet, so far from recognizing this, the author actually bases on the existence of the half-weights an argument for the inclusion of the double weights; a more complete failure to recognize the bearing of facts on theories it is difficult to imagine. What is the bearing of this upon the data set out in Table V? Here thirty-six weights are enumerated in all, of which ten are half-weights; *nsano* appears twice; Prof. Zeller himself queries *ntanu asianu* and *tasuanu*; of the remainder *tosua* is, as pointed out above, not an Ashanti weight. There remain therefore at most twenty-three weights, or, including the four small weights which are not in the geometrical series of the *taku*, twenty-seven weights. Two of these ( $16\frac{1}{2}$  and 60) are irreconcilable with the series; *asuanu* and two more belong to an anomalous series beginning with 216 *ntaku*. We are left, therefore, with less than twenty weights in all, and these are made by Prof. Zeller the basis of an argument to prove that eight distinct series, at least, were formed on arithmetical principles. When we consider that two of these eight series contain half the total between them, it is clear that the theory put forward by Prof. Zeller is a good example of systematization run mad. There is, at most, evidence for the existence of the two longer series; it is clearly absurd to speak of a series when criticism reduces the number of legitimate members to two.

At this point it will be well to consider the bearing of the Baule series recorded by Delafosse on the theory of Prof. Zeller. I will assume provisionally that Prof. Zeller's method is correct and show that his eight or nine series must be expanded to fifteen or sixteen in order to account for these new facts.

The chief groups required to account for the Baule series, a list of which is given in a table at the end of this paper, are as follows. Square brackets indicate explanatory addenda, round brackets that the weights are unknown or non-existent. The Ashanti weights are given for comparison; but it must be remembered that the actual weights are not comparable, the Baule value being two-thirds of the Ashanti value.

## GROUP IX.

| <i>ntaku.</i> | BAULE.               | ASHANTI.       |
|---------------|----------------------|----------------|
| (15) ... ..   | — ... ..             | —              |
| 30 ... ..     | <i>akuabo</i> ... .. | —              |
| 60 ... ..     | <i>asa</i> ... ..    | <i>namfi</i> . |
| 120 ... ..    | <i>asanyô</i> ... .. | —              |

## GROUP X.

| <i>ntaku</i>           | BAULE.                         | ASHANTI.           |
|------------------------|--------------------------------|--------------------|
| $16\frac{1}{2}$ ... .. | — ... ..                       | <i>agirative</i> . |
| (33) ... ..            | — ... ..                       | —                  |
| 66 ... ..              | <i>gbogbandya</i> ... ..       | <i>nansua</i> .    |
| 132 ... ..             | „ <i>nyô</i> ... ..            | —                  |
| (264) ... ..           | — ... ..                       | —                  |
| 528 ... ..             | <i>ta atakpi</i> [= 312 + 216] |                    |

## GROUP XI.

| <i>ntaku.</i> |     |     | BAULE.           |     |     | ASHANTI. |
|---------------|-----|-----|------------------|-----|-----|----------|
| (17) ...      | ... | ... | —                | ... | ... | —        |
| 34 ...        | ... | ... | <i>ndarasue</i>  | ... | ... | —        |
| (68) ...      | ... | ... | ( <i>ndara</i> ) | ... | ... | —        |

Groups XII and XIII appear to have as their bases thirteen and fourteen with a multiple of three; XIII might therefore be regarded as a sub-group on the base of seven, rather than as a group on the base of twenty-one.

## GROUP XII.

| <i>ntaku.</i> |     |     | BAULE.                |     |     | ASHANTI.     |
|---------------|-----|-----|-----------------------|-----|-----|--------------|
| 39 ...        | ... | ... | <i>anuisue</i>        | ... | ... | —            |
| 78 ...        | ... | ... | —                     | ... | ... | <i>anui.</i> |
| 156 ...       | ... | ... | <i>anuinyō</i>        | ... | ... | —            |
| 312 ...       | ... | ... | <i>ta (ko)</i> ...    | ... | ... | —            |
| 624 ...       | ... | ... | <i>ta nyō, ndanyō</i> | ... | ... | —            |

Here may be mentioned two anomalies—936, three *ta*, and 3120, ten *ta*, which weigh  $4\frac{7}{8}$  and  $16\frac{1}{4}$  ozs. respectively (156 grams, 520 grams).

## GROUP XIII.

| <i>ntaku.</i> |     |     | BAULE.         |     |     | ASHANTI. |
|---------------|-----|-----|----------------|-----|-----|----------|
| 42 ...        | ... | ... | <i>tra</i> ... | ... | ... | —        |
| 84 ...        | ... | ... | <i>gua</i> ... | ... | ... | —        |
| 168 ...       | ... | ... | <i>guanyō</i>  | ... | ... | —        |

## GROUP XIV forms the beginning of Keller's VIa.

| <i>ntaku.</i> |     |     | BAULE.            |     |     | ASHANTI.        |
|---------------|-----|-----|-------------------|-----|-----|-----------------|
| 54 ...        | ... | ... | <i>bari</i> ...   | ... | ... | —               |
| 108 ...       | ... | ... | <i>tyasue</i> ... | ... | ... | —               |
| 216 ...       | ... | ... | <i>atakpī</i> ... | ... | ... | <i>asuasū.</i>  |
| 432 ...       | ... | ... | — ...             | ... | ... | <i>tasuanu.</i> |
| 864 ...       | ... | ... | — ...             | ... | ... | <i>ntansa.</i>  |

Group XV contains only one weight, *anansa* (288), and may be included in VI by using a factor of three, or may be referred to Group III. Group XVI includes on the same principle *ndanza*, which may be placed in Group XII. If the principle of multiplication by three is recognized, we can in like manner put at the head of Group IX the actually existing ten *ntaku* of Group V, thus making IX a sub-group of IV; Group VI then follows on with a multiplier of three. But it seems unnecessary to work out these cases in detail.

Some of these six groups are not more improbable than most of Prof. Zeller's groups, though the series beginning with 21 is open to question on the ground that there is no series with 19 as a base; but when we come to consider the bearing of the remainder on Prof. Zeller's argument, we cannot but recognize that series with



bases of 27, 33, 39, 63 and 117 are altogether beyond the bounds of probability.<sup>1</sup> These series, however, include fourteen weights; in other words, nearly half the total are irreconcilable with the principle enunciated by Prof. Zeller. If none of the Ashanti weights were anomalous, he might indeed reply that the Baule weights are built up on a different system, but taken in conjunction with the anomalous Ashanti weights, the new facts are a convincing disproof of Prof. Zeller's hypothesis.

If we now form a series of the whole of the weights so far known, we find there are in all fifty-nine places in the geometrical series; and for these we have in all only forty original names after deducting the half-weights. These forty are of course distributed irregularly over the various groups, but even taking the results in bulk, it cannot but throw further doubt on Prof. Zeller's views when we find that only two out of every three weights required by the theory are actually represented in collections or otherwise vouched for. It is good *prima facie* evidence that the material has not been grouped according to its natural affinities, but forced into pigeon-holes to meet the exigencies of a theory.

There are further criticisms of method to which Prof. Zeller has laid himself open; he has, for example, introduced Akem weights into the Ashanti series, when the former are not of the same denomination as the latter; but enough has now been said to show that his theories are inherently improbable; and it is unnecessary to labour errors of detail. I abstain therefore from a full analysis of the Akem data, which present the same deficiencies as those from Ashanti already dealt with.

There is, however, one point on which a few remarks are necessary. It is possible to regard the series from a linguistic point of view as well as from the standpoint of arithmetic. If we consider the seriation of the names, as distinct from that of the weights, in Prof. Zeller's tables, we find that weights with related names are scattered at random in different groups. Not only so, but the analysis of the names shows that the factor of multiplication present in the native mind is not two in many cases but three. It is a point which has not been overlooked by the author, but he has dismissed it with an impersonal recognition of the fact that a geometrical progression is not the link between individual weights, and gone on to build up his theory undeterred by this objection.

I have pointed out above several cases in which the multiple of two does not account for the facts; an examination of the names shows that whatever be the result in practice, the native view does not necessarily coincide with the European one; in the case of *ta atakpi* we have what is apparently a multiple (by eight) of *gbogbandia*; but to the native mind it has presented itself as the sum of two weights, one greater than the half-weight, one smaller, which Prof. Zeller's method ranges in totally different series.

Other striking instances are found in Bellom's arithmetic. In some places

<sup>1</sup> By taking three as the factor they can be included in the less improbable groups.



44 *ntaku* is known as *suru ne broofa*  $(36 + \frac{16}{2})$ , 88 is *oma ne agirawe*  $(72 + 16)$ , 96 is *dīcowa ne dīcowsuru*  $(64 + \frac{64}{2})$ . In a more complicated case we have 160 *ntaku* expressed as *nncowa mienu nedwowa suru*  $(64 \times 2 + \frac{64}{2})$ . But in Prof. Zeller's tables all these cases form part of normal series.

Other anomalies come out when we consider the Ashanti names; *sua* is 72 *ntaku*; if *nansua* (64 or perhaps 60 *ntaku*) did not form one of a series with *sua* we can see no reason for the similarity of name. *Asuasa* is 3 *sua* and must surely belong to the same series. *Ta* with Müller is 288 *ntaku*; *ntansa* (864), 3 *nta*, indicates that it was 288 *ntaku* at one time; yet Prof. Zeller ranges the latter quite unconcernedly in his Series VIa, which is itself anomalous in having 6 *suru*, 216 *ntaku*, as its base. If two as a multiplier is the foundation of the whole system, it is inexplicable that we should have the names compounded with three as a multiplier; and the practice of adding two unequal factors is more irreconcilable still with Prof. Zeller's theory. If the weights were arrived at by calculation, the next stage would surely have been to give them names and the last process the making of the weights themselves. The names of a group of weights should show relations with their own group only; in point of fact apart from cases of multiplication by two, which are only a portion of the multiplicatives, no such relation is found. In the revised Group VI we have: *dōmmafa*, *demma* (both Akem), *suru*, *osua*, *asuanu*, *pereduane*, *ntanu*.

There is another feature of these weights to which attention must now be directed, as it bears upon the view that they can be ranged in series in their present form. Certain weights have undergone reduction—*soansa* (20) is not three *soa* (36) but *nso nsa*  $(7 \times 3)$  i.e., 21; in like manner *agirawe* has been reduced from 18<sup>1</sup> to 16½, for we find the *agirawefa* still has the value 9. The Baule name *nzunza* (= *usansa*) bears out the above interpretation; we may perhaps deal with *nnomanu* and *boōdōmmo* on the same lines as equivalent to *ndomanu*  $(14 \times 2)$ , while the latter is related to it as *gbogbandia* to *bandia* in the Baule series (i.e., as 11 to 12). It may be noted that *bo* is a not uncommon subtractive particle in numerals.

These and many other facts in the series of weights are more readily explained if we suppose that some other principle than that of a geometrical progression lies at the root of the matter; in any case it is illegitimate to take reduced weights at their present value as evidence of the series into which they now fall, for they came into existence apart from the series and probably before it.

So far nothing has been said of the Baule names; but it will be convenient at this point to show that an analysis of them does not give results discordant with those found for Ashanti and Akem. We have seen above that *nzunza* is a reduced

<sup>1</sup> Müller, however, gives the value as 16.



weight; *ngwanza* (26) is also recognizably a multiple of 3, and can hardly have been anything else than  $9 \times 3$ , i.e., 27. The Baule word for 9 is now *ogora*, but in other Agni-Twi dialects we find *akrun*, *akun*, *akunu*, *egbono* (the latter clearly a subtractive meaning  $10 - 1$ ).

It is of course possible that both weight and name were introduced from another area; but this is a minor point; for the existence of 3 as a multiplier is evidenced by such forms as *anui nsa* (234), *gua nsa* (252), *ana nsa* (288), *ta* or *nda nza* (936).

The half-weights are: *simbarifa* (24), *ndarasue* (34), *bandiasue* (36), *anuisue* (39); the only feature that here calls for remark is the absence of *ndara* from the list of known weights.

Mention has already been made of *ta atakpi* (8 *gbogbandia*), the value of which is  $312 + 216$ , i.e., 4 *anui* and 3 *tia*; but a more remarkable case is that of *tiasue* (108), the double of *bari*; ordinarily *sue* means one-half, but here *tiasue* means  $1\frac{1}{2}$  *tia*, not a half *tia*. As *atakpi*, however, is two *tiasue*, it is possible that there is some misinterpretation or confusion; on the other hand, *tiasue* may be for *tiatiasue*.

One or two other forms call for notice; there is a form *meteba* for 12 *ntaku*, used also by Müller, which may mean 12 *ba*<sup>1</sup> and perhaps gives a clue to his *ensanne* (36) which appears to be *nsa-ne* (= *me*), i.e.,  $3 \times 12$ , though it is rare to find the smaller multiplicand first. The form *me* is perhaps seen in *bydommo* originally perhaps  $2 \times 12$  but now reduced to 22; with (*bo*) *de* may be compared the form *no*, found in *nsano*.

The forms *simbari* and *bari* (48 and 54) are clearly related; if *bari* was the original weight, *sim* may be regarded as subtractive; Christaller gives a form *simpowa* (6 *powa*); *gbogbandia* is similarly related to *bandia* and we have already seen reason to regard *bo* as a subtractive particle.

Generally speaking, therefore, we find that the Baule series shows anomalies—from Prof. Zeller's point of view—of the same order as the Ashanti and Akem series. It also throws some light on the weights noted by Prof. Zeller in the Paris collections, some of which he has not fully comprehended.

These weights are:—

| NAME.         |     | <i>ntaku</i> . |     | GRAMS (Zeller). |     | GRAMS (Delafosse). |
|---------------|-----|----------------|-----|-----------------|-----|--------------------|
| <i>bandia</i> | ... | 72             | ... | 6               | ... | 12                 |
| <i>asa</i>    | ... | 60             | ... | 10              | ... | 10                 |
| <i>anui</i>   | ... | 78             | ... | 13              | ... | 13                 |
| <i>gua</i>    | ... | 84             | ... | 28              | ... | 14                 |
| <i>dogbe</i>  | ... | 168            | ... | 28              | ... | —                  |
| <i>ta</i>     | ... | 312            | ... | 52              | ... | 52                 |

Prof. Zeller suggests that *asa* and *bandia* are *asse* and *bende*, but *asa* is unmistakably *asia* (48); *bandia* is equally clearly *ba-n-dyoo*, in which *ba* is a synonym for *taku*; we also find the forms *maku*, where *ku* appears to mean one (*eko*). If we compare *asa* and *asia* we find the weight raised by one-fourth; a similar rise in the case of

<sup>1</sup> There is, however, a form *asoba*, which cannot be so interpreted and may imply *ba* = 6; we should expect *bamete* (cf. *banso* = 7).



*dyoa* would make it nearly equivalent to *bandia*; the actual relation is 8 : 9. These relations are in terms of *ntaku*; the Baule weights being only two-thirds of the Ashanti weights, owing to the fact that the *taku* contains 2 *pesewa* instead of 3, the weight relation of *asia* to *asa* is 6 : 5.

In one case, that of a weight of 58 grams, Prof. Zeller points out an error without being able to set it right; it is stated on the label in the Paris Museum to be made up of *ta* + *bandia* [*sue*] ( $52 + 12$ ), while another of 128 grams is stated to be 2 *ta* + 2 *bandia*; the confusion clearly arises from the omission of *sue* in the first case. Where *gbogbandia* is put down as 2 *ta*, there is another sort of confusion; the real value is 11 grams, but Prof. Zeller has read, or misread, the label as 115 grams; the mere insertion of a point gives us 11.5 grams, a sufficiently near approximation.<sup>1</sup>

Between the weights mentioned above and those dealt with by Prof. Zeller are some clear relations which he has failed to detect: bearing in mind the raising of the Baule weights by one-fourth of the number of *taku* in the Ashanti weights, it is clear that *anui* (78) is probably equivalent to *anamfi* (60), *gua* (84) to *nansua* or *egwa* (64) and *ta* (312) to *nta* or *ta* (288).

Up to the present I have done little beyond pointing out certain inconsistencies in the author's argument and certain facts inconsistent with his deductions. I now proceed to analyse the data on another basis and put forward an hypothesis, which, though it is not the one to which I propose to pin my faith, is at least as stable as that put forward by Prof. Zeller. The main purpose of the pseudo-theory is to provide an illustration of how easily numerical data can be pressed into the service of either of two hypotheses which have in reality no connection whatever with each other.

If we look at the Ashanti series as a whole and consider the intervals between the successive weights, we find that there are intervals of 1 *taku* from 6 up to 14 *ntaku*; from this point to 28 *ntaku*, assuming that *agiratwe* was originally 18, we have an interval of 2 *ntaku*; from 30 to 64, with a gap at 52, we have an interval of 4 *ntaku*; then follow weights with irregular intervals, all of which are multiples of 8.

It is clear that the gaps in the series so regarded are relatively few, and that they are far less serious in their bearing on the probability of the theory, than are the gaps in the series to which Prof. Zeller pins his faith. If the examination of the Baule series gives similar results, the theory of equal intervals as the origin of the weights is in a far happier position than is the geometrical progression theory put forward by Prof. Zeller, which is expanded by the Baule data to abnormal and incredible dimensions.

The Baule intervals are: 1 *taku* from the beginning of the series up to 12; 2 *ntaku*,

<sup>1</sup> In connection with this error, which Prof. Zeller should have detected by simple inspection of the weights, he falls into an unhappy blunder by declaring that  $104 + 12 = 126$ , and adds "auch hier dasselbe Unzuverlässigkeit," an unfortunate collocation of words under the circumstances.



with a gap at 28, from 12 to 36; 3 *ntaku* up to 48 with a gap at 45; 6 *ntaku* from 48 to 84; 12 *ntaku* from 84 to 168; then come irregular intervals, all multiples of 6, and finally we have longer intervals running in some cases into hundreds.

Thus in the four series only two irregular intervals are found, and from the point of view of symmetry the results are far above those given by the geometrical hypothesis, even if we do not suppose that the gaps were filled by weights at present unknown. If the numbers only are to be taken into consideration and all other elements of the problem to be disregarded, it is clear that the theory of equal intervals must win the day. I do not, however, suggest that the series was actually built up in the way just illustrated. It is *prima facie* far more probable that certain primary weights were first called into existence, perhaps by the process of balancing a mass of metal against a given number of the seeds which are still recognized as the base of the four small weights below the *taku*. The intervals were filled up little by little by the creation of intermediate weights which only gradually attained names and a definite status. This theory will account for the following elements in the data: (a) the relationship of the names of neighbouring weights; (b) the halving and doubling of certain weights, the multiplication of others by 3, 5 or 10, and the addition of factors in other cases in the place of multiplication—these were not methods that played a great part in the creation of the actual weights, but served mainly as a means of naming actually existing weights; (c) for the difference in meaning between the Akem, Ashanti and Baule terms.

(a) The relationship of the names of neighbouring weights has been illustrated above and it is clear that where a named weight of 36 *ntaku* existed and an unnamed weight of 40 *ntaku*, there might easily come into existence a name meaning "just beyond 40"; *pere* in the name *peresuru* appears to be derived from a root meaning "advance, go on"; in the same way *pereduane* (288) may be explained as the weight just beyond the *benna* (256), though here the relationship of names is less obvious.

(b) Multiplication and the addition of factorials have been sufficiently illustrated already; it may, however, be noted that *suru* in the terms *dyoasuru* and *anamfi suru* means one-half; as *suru* itself is the half of *sua*, it may well be that it was so named as the half *par excellence*. The position of *simbari*, a half of *ana*, which is a weight of equal importance with *ana*, suggests that the inference already drawn as to its relation to *bari* may be correct; in any case *bari* and *simbari* illustrates the theory put forward above as to the filling up of gaps.

(c) If the names of weights were, so to speak, in the air, before they were finally accepted, it would certainly happen that, as was the case with our own local weights, the same name would have different meanings in different areas; these weights might well, bearing in mind the normal limits of variation of African weights (often 25 per cent.), be confused in the minds of travellers and perhaps of merchants. Among Prof. Zeller's data we find cases where the *taku* varies by as much as 50 per



cent. ; even a large weight like the *asuanu* varies by 5 per cent. ; if in spite of this the weight was still recognized in its own area as genuine, it is clear that in a neighbouring area it would tend to attach itself to an anonymous weight of about the same value. The variation in the *dýoa*, for example, is between 14·2 and 16·9 ; and the Ashanti *dýoa* is to the Akem *dýoa* as 56 is to 64. I use this case simply as an illustration ; for it is open to question whether, as Akem *gua* is etymologically equivalent to Ashanti *dzua*, we should not equate the Akem *dýoa* with Müller's *egguba* or *egwa*. I may perhaps mention in passing, as another possible source of discrepancies, the desire to have weights giving quantities of gold-dust exactly equal in value to the European coins in use on the Coast.

Whether we can now determine the original weights on which all the others were based is perhaps open to question. De Marees and Müller give us *taku*, *metaba* (12), *agirakwe* (16), *ensanne* (24), *eggwasue* (32), *egguba* (64), *bend afan* (128), and *benda* (256), with perhaps a number of small weights too unimportant to be noticed. Our unhappy ignorance of the age of the specimens in European museums does not unfortunately allow us to test this list nor to prove that the series as set out by Prof. Zeller is a creation of recent times. In any case the absence of names to the older series would be an almost insurmountable obstacle in the way of utilizing them as historical data.

If instead of looking for older data we consider the series as we actually find them and select the names that appear to be primary, we get the following series :—

ASHANTI : *sqa* (12), *dema* (14), *borowco* (16), *suru* (36), *asia* (48), *dýoa* (56), *nansua* (or *egwa*) (64), *sua* (72) and *benna* (256).

BAULE : *diappa* (3), *ake*, *metaba* (12), *asoba* (18), *kuabo* (30), *tra* (42), *bari* (54), *asa* (60), *tia* (72), *anui* (78), *gua* (84), *ana* (96), *atakpi* (216), and *ta* (312).

There are, however, a number of deductions, probable or possible, some of which have already been indicated. *Benna* is 4 *egwa* and may contain the factor 4 (*na*). *Suru* may be half *sua* ; *asia* may be a derivative of 3 (*asa*). *Asa* and *ana* appear to be derivatives of 3 and 4 ; and so on. The difficulty is, however, that linguistic dependence does not necessarily mean dependence in fact ; even if the one word is derived from the other, it does not follow that it was derived from it as a result of the relation of the two weights ; it may have been an earlier derivative and applied as a matter of convenience to the weight, not a new word created *ad hoc*. The series, therefore, set out above does not represent my idea of what the hypothetical original series must have been.

As regards *gua*, the relation of the word to Müller's *egwa* seems obvious but, failing that, a case can be made out for *sua* as the correlative. The sound-shift *gua* (Akem)—*dzua* (Ashanti) is well known and recent ; *gua* and *sua* may therefore be two forms of the same word.

In connection with these weights, Prof. Zeller mentions the *mítal* (24) and *barifari* (96), with a value double that of Delafosse's *simbari*. The plural of *simbari*



is given as *manna* by Binger, but in view of the fact that *ana* is recorded for 96 by Delafosse, it is impossible not to feel some doubt as to the correctness of Binger's statement. It seems simpler to regard *barifari* and *simbari* as synonymous than to take the former as a synonym of *ana*. In either case, however, *bari* is not related factorially to either in any simple ratio, but bears the same relation to *simbari* that *suru* does to *anamfisuru*; as *bari* and *suru* are each 9 grams in weight, the relationship is instructive, in spite of the shifting of the Baule weights. *Anamfisuru*, between *dyoasuru* and *suru*, appears to mean in the middle of *suru*.

If *suru* and *bari* are equivalents, we may assume that the latter is connected with *fa* and also means one-half. It is of course a mysterious feature of the progression that *simbari* has a half-weight *simbarifa*; it is tempting to make *simbari* an original weight and to derive *bari* from it; *nsim* in Ashanti means a makeweight and is clearly not applicable, whatever the genealogical relation of the weights.

To the list given above Binger<sup>1</sup> makes a few addenda. Two *damna* are 1 *banan*; 3 *banan* 1 *diappa*, 8 *banan* 1 *safan*, 3 *safan* 1 *mitkal*, and 4 *mitkal*, 1 *barifari* (pl. *manna*). In terms of the *taku* therefore the series is:

|               |     |                             |
|---------------|-----|-----------------------------|
| <i>damna</i>  | ... | $\frac{1}{2}$ <i>taku</i> . |
| <i>banan</i>  | ... | 1 "                         |
| <i>diappa</i> | ... | 3 "                         |
| <i>safan</i>  | ... | 8 "                         |
| <i>mitkal</i> | ... | 24 "                        |

These do not, however, make an important addition to the lists already noticed.

The theory, therefore, that I put forward as to the origin of the weights is this: the weights originally recognized were few in number and before the gaps were filled up the intermediate weights were already in existence, though they had no definite names and their value was doubtless far from settled. It is not clear whether the weights themselves or only the names were arrived at by processes of multiplication, etc.; probably both processes went on, as well as the addition or subtraction of small amounts from actually existing weights so as to fill the larger gaps; in this connection the use of *nsim* (makeweight) is instructive; the *dýoa* is 64 *ntaku* and the *dýoagyina* [*gyina* (= scale) stands] is the *dýoa* with one unit subtracted, i.e., a reversed makeweight, in this case, 1 *taku*; up to a certain point, therefore, there is a justification for the theory of equal intervals.<sup>2</sup>

Another process was to add fractional weights to those already known and in this way came into existence perhaps *ta atakpi* (312 + 216). The relation of these two weights resembles that of *nansua* and *taki mansua*, differing only by 2 per cent. Other examples of the rule are seen in *ntanu asuanu* (576 + 144) *tasuanu* (288 + 144),<sup>3</sup> and *tosua* (288 + 72).

<sup>1</sup> *Du N.*, I., 164-166, 309 (No. 4).

<sup>2</sup> We have also *gboqbandia* (66), *bandia* (72), *nansua* (64), *sua* (72); *suru* (36), *peresuru* (40).

<sup>3</sup> Singularly enough these names are applied as secondary or even primary denominations where we regard the facts from another angle; 2 *asia*, 96 *ntaku*, is called *dýoa ne dýoa suru* (64 + 32).



The practical consequence of these different methods was to give us a series to which in some degree and by a little forcing the theory of Prof. Zeller can be made to apply. I have shown, however, that the objections to his view are numerous, and that if the numerical relations alone are regarded it is far better and far simpler to adopt the theory of equal intervals. When, however, linguistic considerations are also brought into play, the balance of evidence lies decidedly in favour of a theory of gradual building up as a result of purely practical and opportunist considerations. The practical convenience of daily life demanded that small differences of weight should be readily determinable, but it was not on any predetermined scheme that the negro set out to construct his weights. Arithmetical no less than linguistic considerations lead to the rejection of Prof. Zeller's view and to the adoption of the alternative one here proposed.

## APPENDIX.

In the following table I give (a) the Ashanti data; (b) the data for weights common to Akem and Ashanti; (c) the Akem data; (d) the Baule data; (e) the weight in grams of the Ashanti weights; (f) the value in terms of a lower unit; and (g) European values and English weights in a few cases.

It may be noted that the Baule weights are two-thirds of the Ashanti weights; but that the *pesewa* and *dama* are the same for both. The Baule *taku* is worth 2 *dama* instead of 3. The money value appears to be the same for both series, as a gram of gold is worth, according to Christaller, 2s. 3d. (or 2s. 6d. with gold at £4 an ounce), while Zeller states that the Paris label gives the value of the *ta* as 156 frs., i.e., the gram in Baule is worth 2s. 6d.

The words bracketed in Column 1 are from Müller, those in Column 4 from Binger; the bracketed weights are the Baule values.

| ASHANTI.                                 | AKEM AND<br>ASHANTI.            | AKEM. | BAULE.                                      | WEIGHT.   | VALUE.              | NOTES.      |
|--|---------------------------------|-------|---|-----------|---------------------|-------------|
| —  | <i>powa</i> <sup>1</sup> ...    | —     | —   | ·02 —     | —                   | —           |
| —  | <i>kpesewa</i> <sup>2</sup> ... | —     | <i>kpesaba</i> ...                          | ·04 —     | 2 <i>powa</i> ...   | —           |
| —  | <i>dama</i> ...                 | —     | <i>dama, dema</i> ...                       | ·08 —     | 2 <i>pesewa</i> ... | —           |
| <i>simpowa</i> ...                       | <i>takufa</i> ...               | —     | —   | ·12 —     | 3 ..                | —           |
| —  | <i>kokoa</i> ...                | —     | <i>taku, de, deni</i><br><i>mako, bako.</i> | ·16 —     | 4 ..                | 6d. or 6½d. |
| —  | <i>taku</i> ...                 | —     | <i>taku</i> (see note)                      | ·25 (·16) | 6 ..                | —           |
| —  | —                               | —     | <i>bango</i> ...                            | — (·32)   | 2 <i>ntaku</i> ...  | —           |
| —  | —                               | —     | ( <i>diappa</i> ), <i>banza</i>             | — (·50)   | 3 ..                | —           |
| —  | —                               | —     | <i>bana</i> ...                             | — (·66)   | 4 ..                | —           |
| —  | —                               | —     | <i>banu</i> ...                             | — (·82)   | 5 ..                | —           |
| ( <i>essurbima</i> )<br><i>soafa</i> ... | }                               | —     | <i>bansyi</i> ...                           | 1·5 (1·0) | 6 ..                | —           |
| <i>fiasofa</i> ...                       |                                 | —     | —   | —         | 6½ ..               | —           |

<sup>1</sup> Another name for *powa* is *nwenefa*.<sup>2</sup> Another name for *kpesewa* is *nwene*.



| ASHANTI.                   | AKEM AND<br>ASHANTI. | AKEM.                 | BAULE.                 | WEIGHT.     | VALUE.           | NOTES.                  |
|----------------------------|----------------------|-----------------------|------------------------|-------------|------------------|-------------------------|
| <i>dɔmmafa</i> ...         | —                    | —                     | <i>banso</i> ...       | 1.75 (1.16) | 7 <i>ntaku</i>   | —                       |
| ( <i>meteba</i> ) }        | —                    | <i>agiratwefa</i> ... | <i>bamokwe</i> ...     | 2.0 (1.3)   | 8 " =            | { 1 dollar;<br>1 ackie. |
| <i>borɔwɔfofa</i> }        | —                    | <i>dɔmmafa</i> ...    | <i>ba-ɔgora</i> ...    | 2.25 (1.5)  | 9 " =            | 5s.                     |
| <i>agiratwefa</i> ...      | —                    | <i>bɔdɔmmofa</i> ...  | <i>ba-buru</i> ...     | 2.5 (1.6)   | 10 "             | —                       |
| <i>nsɔansafa</i> ...       | —                    | —                     | " <i>neko</i> ...      | 2.75 (1.8)  | 11 "             | —                       |
| <i>bɔdɔmmofa</i> ...       | —                    | —                     | <i>meteba, ake</i>     | 3.0 (2.0)   | 12 "             | —                       |
| —                          | <i>soa</i> ...       | —                     | <i>nzyis.</i>          | —           | —                | —                       |
| —                          | <i>fiaso</i> ...     | —                     | —                      | 3.25 —      | 13 "             | —                       |
| <i>dɔmma</i> ...           | —                    | —                     | <i>banso</i> ...       | 3.5 (2.3)   | 14 "             | —                       |
| ( <i>eggrague</i> ) }      | —                    | <i>agiratwe</i> ...   | <i>mokweo</i> ...      | 4.0 (2.6)   | 16 "             | 2 ackie.                |
| <i>borɔwɔ</i> }            | —                    | —                     | —                      | 4.12 —      | 16½ "            | —                       |
| <i>agiratwe</i> ...        | —                    | <i>dɔmma</i> ...      | <i>asoba</i> ...       | 4.5 (3.0)   | 18 "             | —                       |
| —                          | —                    | <i>bɔdɔmma</i> ...    | <i>nzuza</i> ...       | 5.0 (3.3)   | 20 "             | —                       |
| <i>soansa</i> ...          | —                    | —                     | —                      | 5.5 —       | 22 "             | —                       |
| <i>bɔdɔmma</i> ...         | —                    | —                     | { ( <i>milkal</i> )    | (4.6) —     | 24 "             | —                       |
| ( <i>ensanne</i> ) }       | —                    | —                     | <i>simbarifa</i> ...   | 6.0 (4.0)   | 24 "             | —                       |
| <i>nnomanu</i> ...         | —                    | —                     | <i>ngwanza</i> ...     | 6.5 (4.3)   | 26 "             | —                       |
| <i>nsano</i> ...           | —                    | ? <i>nsano</i> ...    | —                      | —           | 28 "             | —                       |
| <i>dyoasuru</i> ...        | —                    | ? <i>nsano</i> ...    | <i>kuabo</i> ...       | 7.5 (5.0)   | 30 "             | —                       |
| —                          | —                    | <i>dyoasuru</i> ...   | —                      | 8.0 —       | 32 "             | 4 ackie.                |
| ( <i>egwasue</i> ) }       | —                    | —                     | <i>ndarasue</i> ...    | — (5.6)     | 34 "             | —                       |
| <i>anamfisuru</i> }        | —                    | —                     | <i>bandiasue</i> ...   | 9.0 (6.0)   | 36 "             | —                       |
| —                          | <i>suru</i> ...      | <i>suduo</i> ...      | <i>anuisue</i> ...     | 9.75 (6.5)  | 39 "             | —                       |
| —                          | —                    | —                     | —                      | 10.0 —      | 40 "             | —                       |
| <i>peresuru</i> ...        | —                    | —                     | <i>tra</i> ...         | 10.5 (7.0)  | 42 "             | —                       |
| —                          | <i>takimansua</i>    | —                     | —                      | 11.0 —      | 44 "             | —                       |
| ( <i>asyan</i> ) ... }     | —                    | —                     | <i>nimbari</i> ...     | 12.0 (8.0)  | 48 "             | 6 ackie.                |
| <i>asia</i> ... }          | —                    | —                     | <i>bari</i> ...        | 13.5 (9.0)  | 54 "             | —                       |
| —                          | —                    | —                     | —                      | 14.0 —      | 56 "             | —                       |
| <i>dyoa</i> ...            | —                    | —                     | <i>asa</i> ...         | 15.0 (10.0) | 60 "             | —                       |
| <i>anamfi</i> ...          | —                    | —                     | —                      | 16.0 —      | 64 "             | 8 ackie.                |
| ( <i>egguba</i> ) }        | —                    | <i>dyoa</i> ...       | —                      | —           | —                | —                       |
| <i>nansua</i> }            | —                    | —                     | <i>gbogbandia</i> ...  | 16.5 (11)   | 66 "             | —                       |
| —                          | —                    | —                     | ? <i>ndara</i> ...     | 17.0 (11.6) | 68 "             | —                       |
| —                          | <i>osua, sua</i>     | —                     | <i>tia, bandia</i> ... | 18.0 (12)   | 72 "             | —                       |
| —                          | —                    | —                     | <i>anui</i> ...        | 19.5 (13)   | 78 "             | —                       |
| —                          | —                    | —                     | <i>gua</i> ...         | 21.0 (14)   | 84 "             | —                       |
| —                          | —                    | —                     | <i>ana</i> ...         | 24.0 (16)   | 96 "             | —                       |
| —                          | —                    | —                     | <i>tiasue</i> ...      | 27.0 (18)   | 108 "            | —                       |
| —                          | —                    | —                     | <i>asanyo</i> ...      | 30.0 (20)   | 120 "            | —                       |
| ( <i>ben afa</i> ) }       | —                    | —                     | —                      | 32.0 —      | 128 "            | { 16 ackie.<br>1 oz.    |
| ( <i>eggub abien</i> ) : } | —                    | —                     | —                      | —           | —                | —                       |
| —                          | <i>nnwɔica</i> }     | —                     | —                      | —           | —                | —                       |
| —                          | <i>mienu</i> }       | —                     | <i>gbogbandianyo</i>   | 33.0 (22)   | 132 <i>ntaku</i> | —                       |
| —                          | —                    | —                     | <i>bandia nyo</i> ...  | 36.0 (24)   | 144 "            | —                       |
| —                          | <i>asuanu</i> ...    | —                     | <i>anui nyo</i> ...    | — (26)      | 156 "            | —                       |
| —                          | —                    | <i>nnwɔica</i>        | —                      | 40.0 —      | 160 "            | —                       |
| —                          | —                    | <i>nnienu ne</i>      | —                      | —           | —                | —                       |
| —                          | —                    | <i>dyoasuru.</i>      | —                      | —           | —                | —                       |
| —                          | —                    | ( <i>dogbe</i> ) ...  | <i>gua</i> ...         | 42.0 (28)   | 168 "            | —                       |

<sup>1</sup> *Nnwɔica* (*ngyɔwa*) is the plural of *dyoa* (*dwoica*), possibly connected with *diceba*, *gweba*, palm kernel.

| ASHANTI.         | AKEM AND<br>ASHANTI. | AKEM.       | BAULE.                     | WEIGHT.    | VALUE.    | NOTES.  |
|------------------|----------------------|-------------|----------------------------|------------|-----------|---------|
| (eggwa abiessan) | —                    | —           | ana ...                    | 48·0 (32)  | 192 ntaku | —       |
| —                | asuasa ...           | —           | atakpi...                  | 54·0 (36)  | 216 "     | —       |
| —                | —                    | —           | anui nsa ...               | — (39)     | 234 "     | —       |
| —                | —                    | —           | gua nsa ...                | 63·0 (42)  | 252 "     | —       |
| —                | benna ...            | —           | —                          | 64·0 —     | 256 "     | —       |
| (ta) ...         | pereduane            | —           | anansa ...                 | 72·0 (48)  | 288 "     | —       |
| —                | —                    | —           | ta (ko) ...                | 78·0 (52)  | 312 "     | —       |
| —                | —                    | —           | ta atakpi <sup>1</sup> ... | 132·0 (88) | 528 "     | —       |
| —                | ntanu ...            | —           | —                          | 144·0 —    | 576 "     | —       |
| —                | —                    | —           | tanyō, ndanyō              | — (104)    | 624 "     | —       |
| —                | —                    | nlanuasuanu | —                          | 180·0 —    | 720 "     | —       |
| —                | ntansa ...           | —           | —                          | 216·0 —    | 864 "     | —       |
| —                | —                    | —           | tanza, ndanza              | — (156)    | 936 "     | —       |
| (bend anan) ...  | —                    | —           | —                          | 256·0 —    | 1024 "    | 8 ozs.  |
| (bend aquoi) ... | —                    | —           | —                          | 512·0 —    | 2048 "    | 16 ozs. |
| —                | —                    | —           | ta buru ...                | — (520)    | 3120 "    | —       |

<sup>1</sup> Other weights which follow are simple multiples of ta.

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A number of authors, whose names figure in the Bibliography, refer to the gold weights. Consideration of space prevent me from discussing their data and the difficulties which they raise. The authors are Barth, Binger, Bosman, Bowdich, Christaller, Cruickshank, Dapper, de Marees, Dupuis, Hacquard, Macdonald, Monrad, Monteil, Müller, and Peregaux. I hope to publish an analysis of their information at some future date.

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## THE OUTRIGGERS OF INDONESIAN CANOES.

By A. C. HADDON.

## CONTENTS.

|  | PAGE        |
|--|-------------|
| Material ... ..  | 70          |
| Terminology ... ..   | 72          |
| Double Canoes ... ..   | 77          |
| The Distribution of Single and Double Outriggers ... ..                                | 78          |
| The Number of the Outrigger-Booms ... ..   | 79          |
| The Attachment of the Booms to the Hull ... ..   | 82          |
| The Float ... ..   | 83          |
| The Attachments between the Booms and the Float and their Distribution :—              |             |
| A.—Direct :—   |             |
| 1. Inserted ... ..   | 83, 123     |
| 2. Lashed ... ..   | 83, 124     |
| 3. Mixed Direct Attachment ... ..  | 84          |
| B.—Indirect :—   |             |
| (a) Attachment inserted into the Float :—  |             |
| 1. Stick ... ..  | 84, 125     |
| 2. Rod ... ..  | 87          |
| 3. Spike ... ..  | 79, 87, 127 |
| 4. Y-shaped Stick ... ..   | 87, 127     |
| 5. Board ... ..  | 87, 128     |
| 6. Balinese ... ..   | 73, 88, 128 |
| (b) Attachment tied to the Float :—  |             |
| 1. Moluccan ... ..   | 89, 129     |
| 2. Halmaheran ... ..   | 90, 129     |
| C.—Mixed Attachments :—  |             |
| 1. Mixed Direct and Balinese ... ..  | 84, 92      |
| 2. Mixed Direct and Rod ... ..   | 92          |
| 3. Mixed Direct and Halmaheran ... ..  | 94          |
| 4. Mixed Rod and Halmaheran ... ..   | 96          |
| Notes on the Characteristic Outrigger Canoes of the Main Districts of Indonesia ... .. | 97          |
| Notes on the Native Names for Canoes and Outriggers ... ..                             | 116         |
| General Conclusions ... ..   | 119         |
| Bibliography ... ..  | 131         |

For several years I have been accumulating material dealing with the outrigger canoes of Indonesia, of which I now present a brief and general account, though I am fully aware of the imperfection of my data. Much more remains to be done by observations in the field, by a more exhaustive treatment of the literature on the subject, and by a study of photographs in the libraries of certain learned societies



and museums, as well as of specimens preserved in numerous museums in various parts of the world. I hope, however, that this essay will help towards a more systematic consideration of the details of construction and of the problems of cultural distribution.

#### MATERIAL.

A word of caution is necessary with regard to the available data. A photograph, or an illustration made from a photograph, is good evidence that a certain form was then present in a given spot, but it is not conclusive that it is the usual or common form there, as any canoe may be a chance visitor. It is only when a photograph shows numerous examples of the same type that it becomes authoritative, or when different photographs agree in this respect. Of far greater value is the explicit statement of a traveller, and I have endeavoured in all cases to record such statements. In drawings or sketches made by travellers a great deal depends on the skill of the draughtsman, his keenness of eyesight, and his knowledge of the details of construction. The unsatisfactory character of illustrations holds good for models, except that the common type is far more likely to be represented. But a further source of error awaits one. The model may be carelessly made and certain details may be slurred over or even wrongly constructed to save trouble. On the other hand, the models as a rule seem to be made by those thoroughly conversant with the vessels, and probably, in many cases, are made by those who actually build boats. The technical skill in model-making which is characteristic of these peoples, and the pride of the artificer, however, give one confidence in accepting models as trustworthy, even though the various parts may not be made exact as regards their relative proportions. Bearing in mind these limitations, I have not shrunk from accepting models as good evidence. In a considerable number of cases the written descriptions by travellers are far from satisfactory, as they often do not appreciate those details which are of interest to a specialist; frequently no description at all is vouchsafed, and we have then to rely solely on any illustration that may be supplied.

Several of the following museums are referred to by the names of the towns in which they are situated:—

Amsterdam, Koninklijk Zoologisch Genootschap. Ethnographical Museum of the *Natura Artis Magistra*.

British Museum, London.

Cambridge, Museum of Archæology and Ethnology.

Edinburgh, Museum of Science and Art.

Halifax, Bankfield Museum.

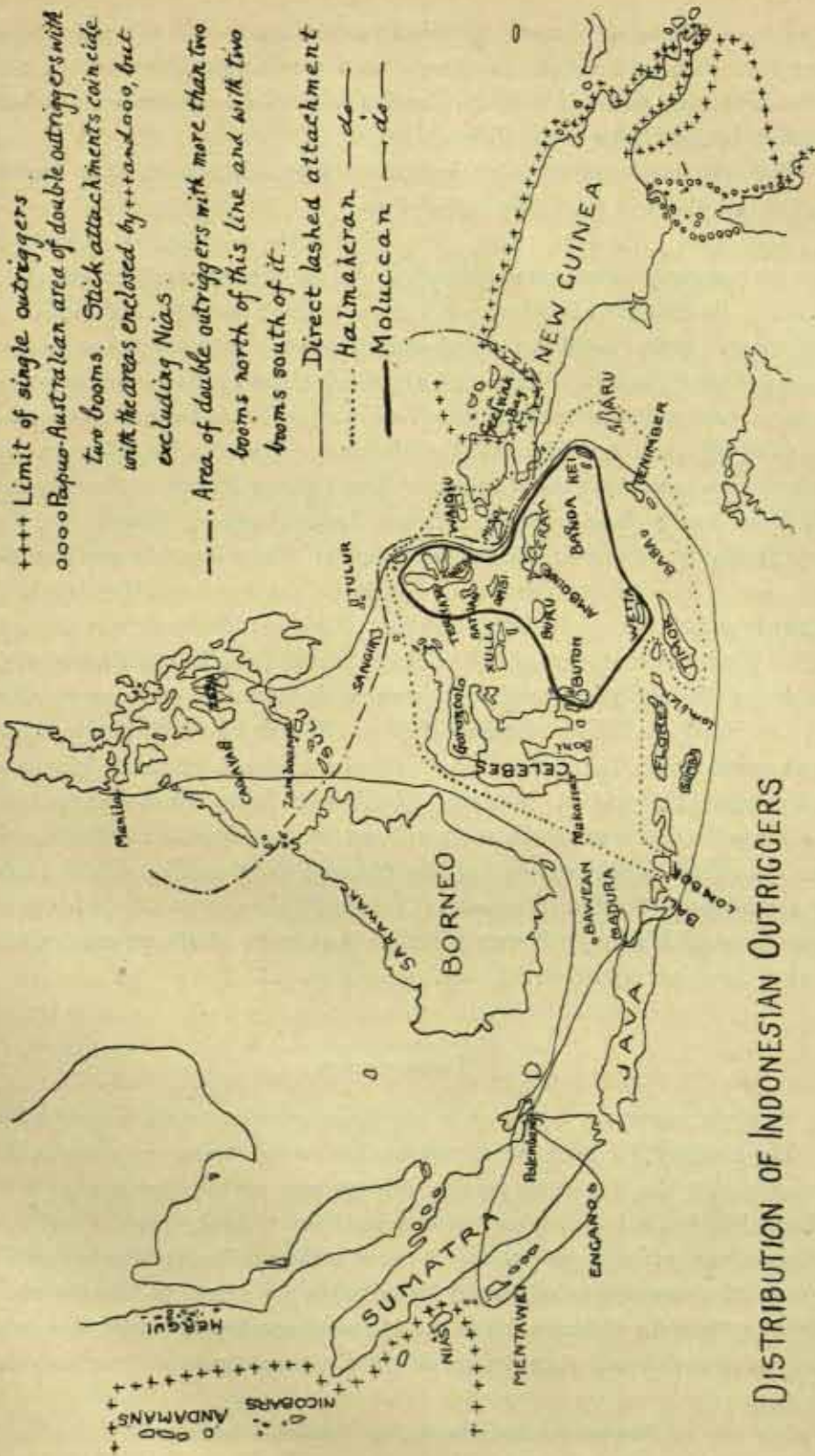
Horniman Museum, Forest Hill, London, S.E.

Leiden, Rijks Ethnographisch Museum.

Oxford, Pitt-Rivers Museum.

Rotterdam, Ethnologisch en Maritiem Museum.

Salem (Mass., U.S.A.), Peabody Museum.



DISTRIBUTION OF INDONESIAN OUTRIGGERS



I take this opportunity of thanking various friends and colleagues who have helped me with information, and would more particularly like to mention Henry Balfour, Ivor H. Evans, Dr. G. Friederici, Dr. F. H. H. Guillemard, Lawrence W. Jenkins, Dr. H. H. Juynboll, H. Ling Roth.

For convenience of reference I shall, as a general rule, mention the several islands and places in the following order:—

Andamans. Nicobars. Nias, Mentawai Islands, and Engano (islands to the west of Sumatra). Sumatra: Palembang (in the south-east of Sumatra). Java. Madura. Bawean Islands (north of Madura). The Lesser Sunda Islands (Bali to Tenimber): Bali; Lombok; Sumbawa; Sumba (Sandalwood Island); Savu; Flores; Solor; Lomblen; Ombai (Allor); Timor; Rotti; Wetta (Wettér or Eetar); Serwatti; Baba (Babber); Tenimber (Tanimbar) or Timor Laut (Timorlao) Islands. Kei (Ke) Islands. Aru Islands. The Moluccas (Banda to Halmahera): Banda; Buru; Amblau; Amboina (Ambon); The Uliasser Islands: Haruku, Saparua and Nusa Laut; Ceram (Seran); Ceram Laut; Goram; Misol; Obi (Ombi); Batjan; Tidor; Ternate; Halmahera (Gilolo): Weda Bay (the southern Gulf of Halmahera), Ake Selaka, Tobelo, and Galela (in the north of Halmahera). Xulla (Sulla) Islands. Butong (Butung). Salaier. Celebes: Makassar and Gowa (Goa), Gulf of Boni (the southern Gulf of Celebes), Tontoli (Toli-Toli, north-west Celebes), Minahassa (the north-east point of Celebes) with the towns of Kema and Menado, and the island of Limbe. Banka. Talisse. Talaut Islands (including the large island of Sangir). Tulus (Tulaur or Salibabu) Islands. Nanusa Islands. Sulu Archipelago. Philippines: Mindanao (Zamboanga at its south-west point), the Gagayanes (Cagayan) group, Zebu (Cebu), and Manila. Borneo: Sarawak, a raj on the north coast. North-west area of New Guinea: Skroë on the south and Sékar on the north side of the Onin Peninsula; Waigiu (Waigen); Saonek (an islet off the south shore of Waigiu); Sorong (a village just south of the extreme north-west point of New Guinea). Geelvink Bay. (See Map, p. 71.)

#### TERMINOLOGY.

To avoid ambiguity I propose to adopt the following terms as here defined:—

The *outrigger* is a balancing apparatus that extends transversely across the hull of the canoe; the transverse poles of an outrigger are *outrigger-booms* (or simply *booms*), their free extremities may be attached directly to the *float*,<sup>1</sup> or indirectly by various methods; in all cases this is spoken of as the *attachment*. Various methods of *indirect attachment* will be sufficiently described in the course of this paper. They consist in the main of bent ratan in the *Moluccan attachment*, or of a *stick* or sticks, a *rod*, or of a variously shaped piece of wood, the *outrigger-spar* or *attachment-spar*

<sup>1</sup> Frequently authors speak of the float as an "outrigger."



(or simply *spar*). A thin spar, *bracing spar*, may pass from the attachment-spar (Fig. 2 D) or sticks (p. 126) to the boom.

There are outriggers in which one or more of the booms may have one kind of attachment and the other or others another kind; these may be termed *mixed attachments*. Cases are known to me, but not in Indonesia, where two kinds of attachment are employed on the same boom; this may be called a *complex attachment*.

In many outriggers there are one or more poles connecting the booms and usually lashed above them, but sometimes beneath them. These may be termed *longitudinal spars*, as they are longitudinal to, that is, parallel with, the length of the canoe, though transverse as regards the length of the booms themselves. They might therefore with justice be termed "transverse spars," but as the booms themselves are transverse as regard to the canoe and they are at right angles to the lie of the booms, it seems preferable to adhere to my former term. Sometimes there is a spar running more or less midway between the hull and the attachments—this may be termed the *central longitudinal spar*; the *outer* and *inner longitudinal spars* run respectively immediately on the outer and inner aspects of the attachment (Figs. 16 B, 17). In Micronesia a spar may pass diagonally from the hull to the end of the outrigger apparatus—this I term a *stay spar*.

*Boom-prolongation*.—This somewhat cumbersome term may be applied to a type of boom that appears to be confined to the East Java—Lombok area. The boom proper is short and thick, but a thinner spar is attached to it, the free end of which is either inserted into or lashed to the float or connected with it by means of a rod-attachment. In small models of canoes from this area the prolongation is inserted into the boom, but the exact method of the junction in actual vessels has been described only in the case of the *sedek*, and the published illustrations known to me are not clear on this point. It may be suggested that the boom was made thick in order to strengthen the hull, but in that case it would obviously be too heavy to form an efficient outrigger; to remedy this the projecting portions might be thinned down (which possibly may occur) or a more slender spar of wood or bamboo might be fixed on to it. The *sedek* of the Balinese attachment (p. 88) is thus merely one form of a boom-prolongation.

Occasionally there is a central outrigger-boom which is lashed to the various longitudinal spars but is not connected with the float by means of a regular attachment, though it may be tied to it by means of a long lashing—this may be termed a *false-boom*. Occasionally, outside our area, more than one false-boom may occur.

There may be above a boom another spar which varies greatly in length, sometimes being as long as the boom itself, in which case it might be regarded as a boom, thus giving rise to an accessory or double boom parallel to the boom proper; but in order to make the term applicable to all its variations, I prefer to describe it as a *boom-spar*. A boom-spar, one end of which rests on the roof of a shelter of a Mentawai



war-vessel, *knabat bogolu* (Fig. 1), is figured by Rosenberg (1888, Pl. XVIII, Fig. 9). Baessler (Pl. VIII, Fig. 4) gives a drawing of a model of a sailing canoe from Wetta

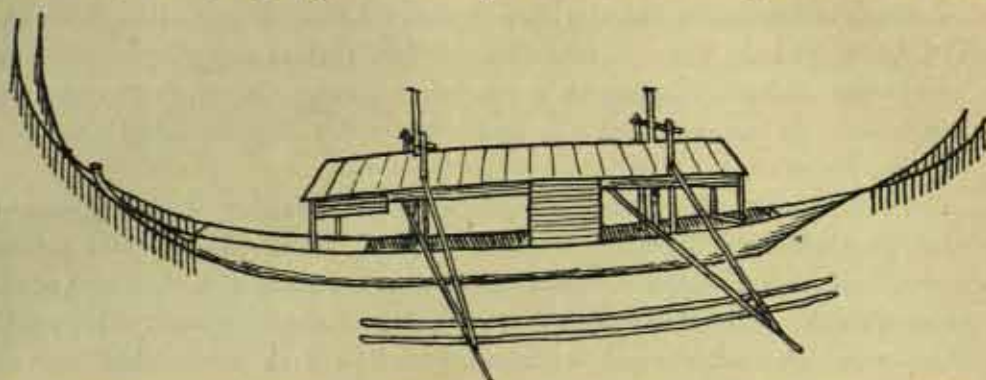


FIG. 1.—MODEL OF A WAR VESSEL, *knabat bogolu*, MENTAWAI ISLANDS (AFTER ROSENBERG, 1888); THE RIGGING OF THE VESSEL IS OMITTED.

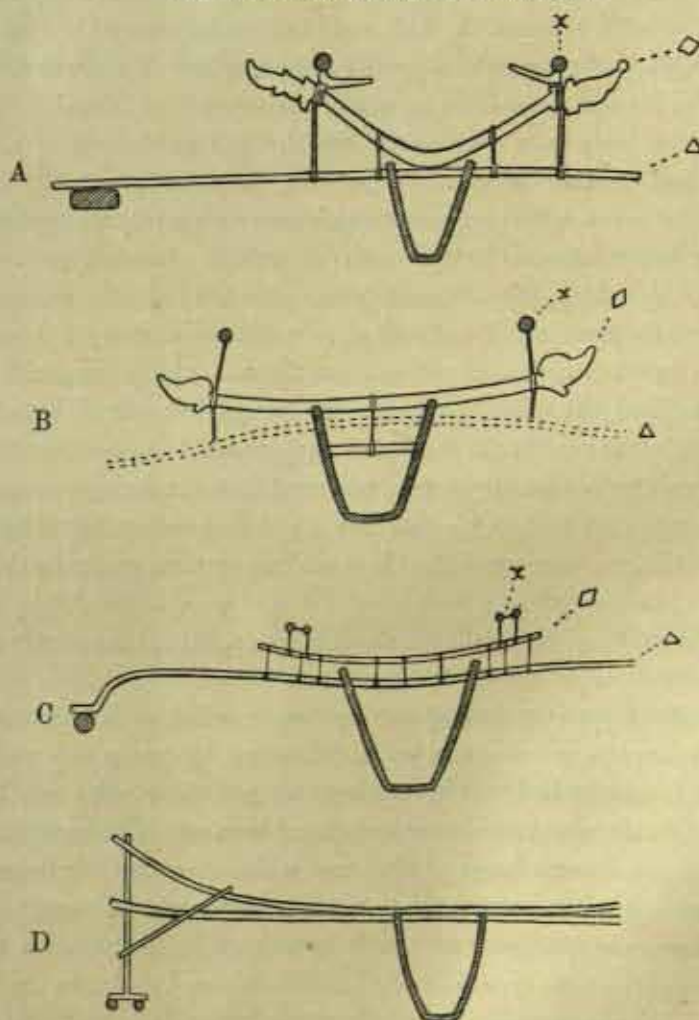


FIG. 2.—SECTIONS OF MODELS OF CANOES: A, SULU; B, MORO CANOE, ZAMBOANGA; C, MORO CANOE, ZEBU; D, SANGIR (FROM MÜLLER, 1912, figs. 55, 56, 57, 58).

(Wetter) Islands with a double outrigger of two straight booms, above which are equally long straight boom-spars, these evidently correspond with those just mentioned; but in this case there is a U-Moluccan attachment, the upper limbs of which are lashed to its boom and boom-spar (Fig. 3). In a model canoe from Tenimber in

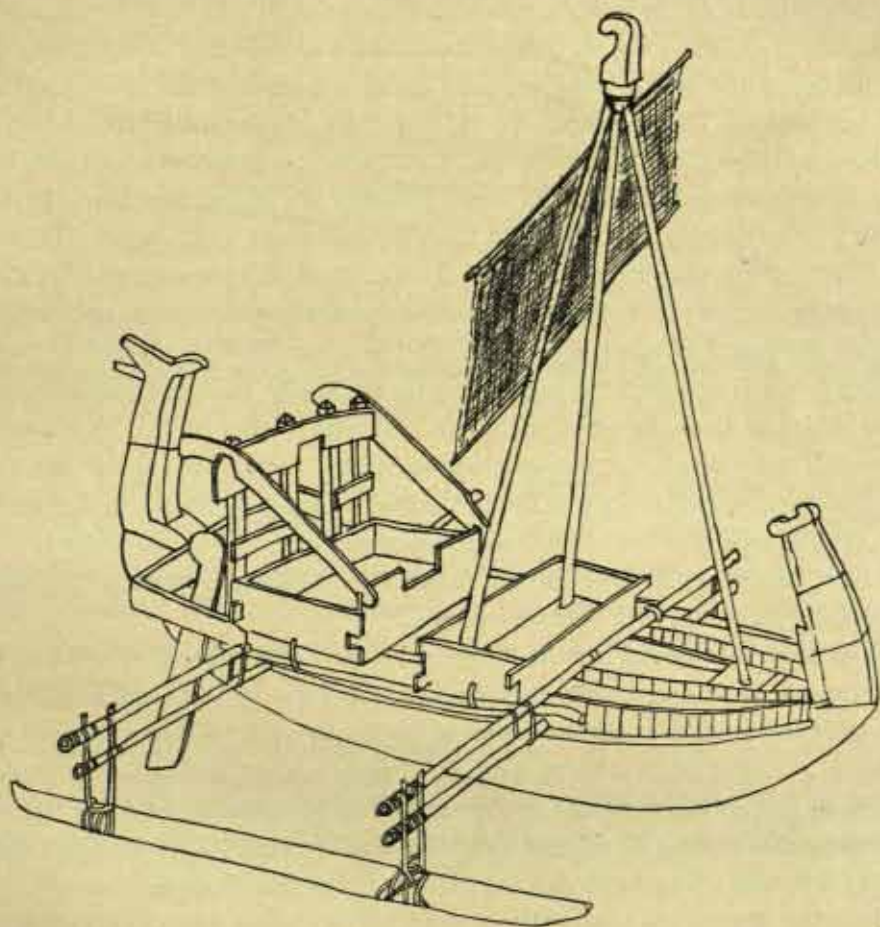


FIG. 3.—MODEL OF A SAILING SHIP, WITH TRIPOD MAST, STRAIGHT BOOMS AND BOOM SPARS AND A U-MOLUCCAN ATTACHMENT, WETTA (FROM BAESSLER).

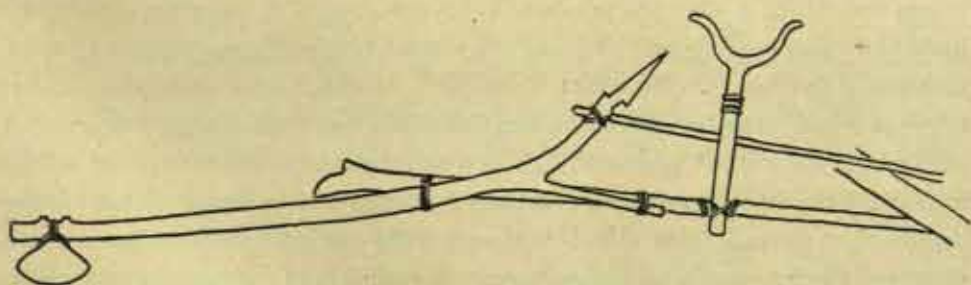


FIG. 4.—MODEL WITH A BOOM SPAR AND HALMAHERAN ATTACHMENT, TENIMBER (LEIDEN).



the Leiden Museum is a thin boom-spar above each true boom; it lies over a longitudinal spar which rests on the two booms and its end is lashed to the upper fork of a Halmaheran attachment (Fig. 4). Müller (1912, p. 244) describes a model of a canoe from Sangir in which the two outer (fore and aft) booms and their boom-spars are attached directly to the float, presumably by a lashing; the inner booms have the arrangement shown in Fig. 2, D, above each of these booms is an equally long and slender boom-spar which turns up at its ends; attached to the ends of the boom and boom-spar is the long stem of a  $\perp$ -shaped attachment-spar, beneath which the double float is fastened; the boom-spar, boom, and attachment-spar are strengthened by a bracing spar; obviously all these elements are lashed together. At Kema, North Celebes (G., No. 232), the Sulu Islands (Guillemaud, 1889, p. 192; G., Nos. 4, 115; Müller, Fig. 55; Savage Landor, II, pp. 2, 12), Zamboanga and Zebu in the Philippines (Müller, 1912, Figs. 56, 57), the upwardly curved boom-spar is greatly reduced in length and may become bowed and have carved ends. It does not support the float, but is attached by lashings to the unusually thin and fragile outrigger-boom which is thus strengthened by the elasticity of the bowed boom-spar. As previously mentioned, the outrigger-booms, which usually are more than two in number, are attached directly lashed to the float. Müller (p. 245) describes the transformation of supernumerary boom-spars into curved crescentic ornaments in the Sangir and Sulu Islands; but these can no longer be termed boom-spars, as they are not necessarily connected with outrigger-booms.

*Outlayers.*—In describing the "Flying Praws" of Borneo, D. Beeckman says: "To prevent their oversetting, they fix two long Poles or Outlayers one across the Fore-part and another at the After-part of the Boat; each end being run into a large Bamboe . . . and when it blows hard, the People run out and in on the Outlayers, according as the Gale is fresher or abates, to keep the Boat upright" (1718, p. 91). Evidently this is what is referred to by R. Munday (1848, I, p. 52), quoting from [Raja] J. Brooke's Journal of January, 1840: "The small sailing boats [at Palette, Gulf of Boni, Celebes] had outriggers of wood, which weighted with men, enabled them to carry a sail of enormous size." Folkard says that the canoes at Manila have no outriggers, "but merely an *outlayer*, or pole, laid across the vessel amidships, and extending several feet beyond the sides" (*f.n.*, p. 482). Lane Fox (Pitt-Rivers) points out (1875, p. 430) the practical utility of a single outlayer for canoes which have but a single outrigger; he terms it a *weather platform*, when a flooring has been laid across the booms. He adds: "We have, in the Asiatic Archipelago, a contrivance which may be said to be derived partly from the double outrigger, and partly from the weather platform. . . . A weather platform had been found sufficient to balance the vessel on one side, and the next step was to knock off the outrigger log [float] on the other side, thereby converting the outrigger platform into a weather platform, the two platforms projecting one on each side of the vessel, on the level of the gunwales, without touching the water. . . . These double weather-platform boats



were also found more convenient in inland waters, in the canals in Manila, and elsewhere." He also quotes the accounts of outlayers in the Philippines by De Guines (1796) and at Manila by Dampier (1686). "Balance poles" are referred to in the *Census of the Philippine Islands*, I, p. 326, Washington, 1905. The outlayer may very well be evolved from an outrigger, but as in the Philippines and Indonesia generally, the canoes have a double outrigger (when they have any at all), there does not seem to be any necessity for the intermediate stage of a single outrigger

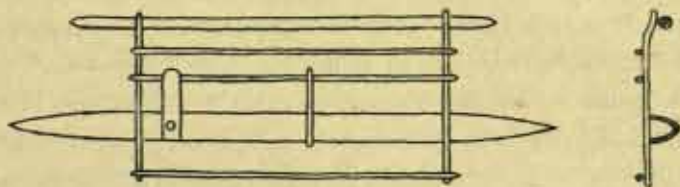


FIG. 5.—MODEL OF CANOE WITH A DIRECT LASHED ATTACHMENT AND AN OUTLAYER, SANGIR, TALAUT ISLANDS (AMSTERDAM).

postulated by Pitt-Rivers for this area. In a carelessly-made model or sketch an outlayer might very well be mistaken for an outrigger. An *outlayer* may therefore be defined as a pole or a simple framework balancing apparatus, and may be *single* (Fig. 5) or *double*. When a platform of boards or closely-laid bamboos or poles is formed, the outlayer may be termed a *weather platform*, which similarly may be *single* or *double*.

#### DOUBLE CANOES.

The only instance known to me of an Indonesian double canoe is that illustrated by Hickson (1889, Fig. 10, p. 164): this is a small model used for ceremonial purposes in the Nanusa Islands to the north-east of Celebes beyond the Salibabu Islands. This *sakit* canoe is composed of two canoes close together; both have equally elongated upturned ends and are crossed by three booms, the ends of which are pegged on to the floats. Müller suggests that this idea of a double canoe may be due to Micronesian influence, and queries whether the outrigger may not universally be traceable to a double canoe (1912, p. 239).

Double canoes, *janjar*, are employed on the rivers of the Malabar coast, South-west India, for conveying cattle and bulky goods across the rivers; from the account by Edye these appear to be temporary arrangements (Edye, p. 6, Pl. III). In the Oxford Museum are three models of double canoes; one is from "India," another from Mirzapore, on the Ganges, and the third from Ceylon. The importance of the double canoe in the early navigation of the Pacific is well known.

That double canoes once occurred in Indonesia is extremely probable, and we may assume that the double canoes of Oceania had their origin in Indonesia.



## THE DISTRIBUTION OF SINGLE AND DOUBLE OUTRIGGERS.

Wherever outriggers occur in Indonesia they are double, with the exceptions noted below (see Map, p. 71) :—

Single outriggers alone are found in the Andamans (Fig. 11, A) and in the Nicobars (Fig. 10, B), but there are other canoes in these islands which are without an outrigger. The Sumatran sailing craft known as *jellore* has sometimes only one outrigger, which is then alternately to windward and leeward (Folkard, p. 481). H. von Rosenberg (1888, Pl. XVIII, Fig. 19) figures a model of a warship, *knabat bogolu*, from the Mentawai Islands (west of Sumatra) which appears to have but a single outrigger on the starboard side; it has two main booms which slope down to the float and each has an accessory boom, which as it slopes down from the roof of the cabin, can hardly be termed a proper boom-spar; there is a double float and apparently a direct attachment (Fig. 1). Folkard states (p. 485) that on the north coast of Java, at Madura, they have sailing boats with single outriggers on the leeward side, while on a kind of rack on the windward side they sometimes place a canoe and everything on board that is movable. An aberrant type from the north coast of middle Java has been noted by Hornell. Pitt-Rivers (Lane Fox) mentions a single outrigger in Borneo, but does not give any reference (1875, p. 429); for toy canoes with a single outrigger from the Sarawak coast see Fig. 32. There is a model in the Amsterdam Museum of a canoe from Sangir with a single outrigger (Fig. 5), the two booms of which project on the other side of the hull to form an "outlayer"; the downwardly curved ends of the booms are lashed to the float by a direct attachment. Numerous canoes with single outriggers from various parts of Indonesia are figured by Nicolas, De Bry and by Valentijn, but as the illustrations given by the old authors do not appear to be always accurate, this evidence cannot be fully relied on; as nearly all the boats are drawn in side-view, only one outrigger could be depicted. De Bry gives only one illustration of a double outrigger, a *coracora* (V, Pl. c A), which is also figured by Nicolas (II, Pl. 9), who calls it *coracora* or *carcolle* of Banda, but Nicolas figures (Pl. 14) a small war-vessel, *carcolle*, with one, and describes (p. 19) the *carcolle* of the King of Ternate as having a double outrigger. We are probably justified in assuming that the outrigger was double in all the Moluccan craft in which one was present.

To the west of Indonesia canoes with a single outrigger and two booms are found in Ceylon and parts of Southern India; as early as 1599 Lintscotus figured the type occurring at Goa and Cochin (II, Tab. XIV). They also extended to the Maldives.

Canoes with double outriggers and two booms occur on the coast of Eastern Africa, the Comoro Islands, and North-western Madagascar. In Madagascar the larger canoes appear to have but one float, though the booms project beyond the other side of the hull to form an outlayer (Haddon, 1918, No. 29). I regret that in this paper I omitted the record by Müller in Madagascar of small, double-outrigger coasting



canoes, and of a large Sakalava sailing boat, *lakka fiara*, with a single outrigger, the float of which has superfluous, overloaded terminal enlargements that resemble the ends of the Hawaiian double canoe, and, Müller adds, perhaps is evidence that Malays voyaged to Madagascar in double canoes (1912, *f.n.*, p. 239). I have recently come across a book by L. (1598) who gives a plate, on p. 6 (drawn in 1595), of two dug-outs with a double outrigger of two booms and a vertical stick attachment; the float appears to be a long thin log. This is the earliest record known to me of this kind of craft in Madagascar, and it adds to the interest to find that it occurred in St. Augustin Bay on the south-west part of the island.

To the east of Indonesia canoes with a single outrigger are the common type in Oceania, and in New Guinea they begin to appear in Geelvink Bay and continue down the coast (p. 122, and Haddon, 1913). The double outrigger is found throughout Geelvink Bay and ceases at Cape D'Urville, at its eastern entrance, but within this area the single outrigger predominates and, like the double-outrigger type, has three or four to a dozen booms. Both kinds of canoes have a new type of attachment which consists of a nail-like wooden spike or stick which passes from above through the end of the boom and is driven vertically into the float. Spikes are usually selected which have a natural thin branch projecting at right angles; this is laid over the boom and tied firmly to it (Fr., II, pp. 249, 252-254). Both kinds of spikes (*i.e.*, with or without the branch) appear to be used indiscriminately and separately, at all events at Ansum (Guillemard, pp. 401, 402, 404; G., Nos. 271, 296, 302, 439, 442). This may be termed a "spike attachment." An inner longitudinal spar is frequently present (p. 127).

#### THE NUMBER OF THE OUTRIGGER BOOMS.

South of a line which passes north of Borneo, Celebes, Halmahera, and Ceram the outriggers almost invariably have but two booms, whereas to the north and east of it they have usually four, rarely more, sometimes three and occasionally only two booms (Map, p. 71).

In the Andamans the smaller canoes are fitted with a single outrigger consisting of three to seven booms (A. R. Brown MS.). Mouat figures four (p. 315), as does Folkard (p. 460). Man (XII, Pl. VII) gives a photograph of a small "dug-out called *chá-rigma*" (p. 116), which has three. Models in the British, Cambridge, Edinburgh, Halifax, Horniman, and Oxford Museums have three. As the early writers did not mention an outrigger, Mouat thought that it was a recent introduction, but Man (XI, p. 272) denies this. Mouat also supposed that it was adopted from the Ceylonese craft, but the type of attachment entirely negatives this wild suggestion. As we shall see, the stick attachment is, however, very close to that of the Nicobarese canoes.

There are only two booms in the Nicobarese canoes.

Judging from photographs (G., No. 267) four booms may occur at Misol and Weda



Bay (G., No. 292, Fig. 6), but usually in Weda Bay, Patani, and Bali, all in Halmahera, the outrigger has two booms with a Halmaheran attachment, but frequently there is a central "false boom," the end of which is connected only by a lashing to the centre

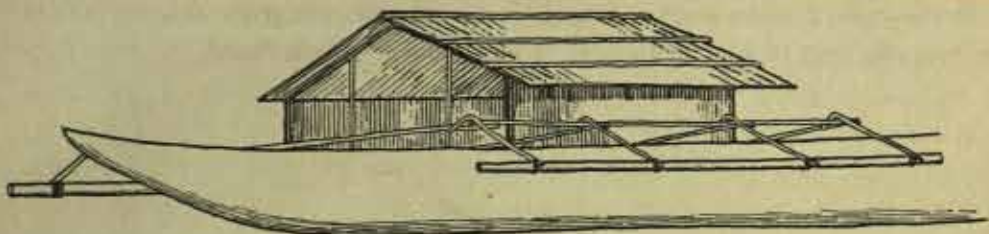


FIG. 6.—CANOE WITH DOUBLE OUTRIGGER, FOUR BOOMS, AND HALMAHERAN ATTACHMENT, WEDA BAY, HALMAHERA (Photo G., No. 292).

of the float (Friederici, II, p. 242). Forrest figures a "Molucca Corocoro" (pl. 4, p. 82) with three booms off Batjan (*cf.* p. 110), and a similar vessel at the Kanari Islands, north-west of Misol (pl. 15, p. 172).

There is a model of a large plank boat from Gowa, South Celebes, in the Leiden Museum, with a double outrigger, five booms with a direct attachment to each float; of these the fore and aft booms are inserted into the float, while the three middle ones are lashed to the underside of the float. It would not be surprising if this were a model of a craft coming from the Sulu area (p. 114). There are usually three booms at Buton, an island off the south-east point of Celebes (Friederici, II, p. 235). Professor S. J. Hickson has presented to the Cambridge Museum several small models of ceremonial *sakit* canoes from Nanusa Island, north-east of Celebes; they have either two or three booms which are pegged<sup>1</sup> on to the floats, or the outrigger may be absent (1893, Fig., p. 290). This island is just on the above-mentioned border line. In spite of these exceptions the canoes of Celebes appear predominantly to have but two booms.

More than two booms usually occur in the Sangir Islands (Müller, p. 244).

In the Sulu Islands small canoes may have but two booms (Guillemard, 1889, p. 206; G., Nos. 180, 217), but usually there are three (Fig. 7) (Wilkes, V, p. 333; Burbidge, p. 225; G., No. 4) or four (Guillemard, 1889, p. 192; G., Nos. 115, 142,

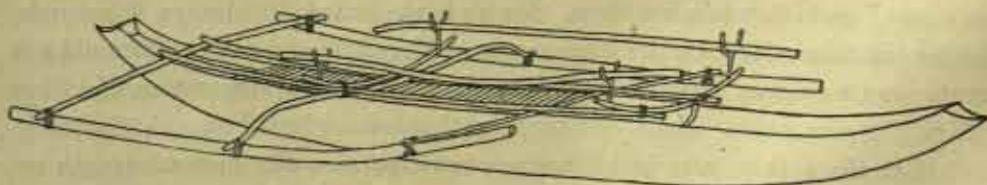


FIG. 7.—CANOE WITH DOUBLE OUTRIGGER, THREE BOOMS, AND DIRECT LASHED ATTACHMENT, SULU (Photo G., No. 4).

<sup>1</sup> I do not regard the pegs as being significant; they are probably merely a labour-saving device.

180, 192, 211; model of a "piratical prahu," *dapang*, Edinburgh Museum). In these canoes the fore and aft booms are always straight, whereas the central booms are downwardly curved at their ends (Fig. 7). Pritchett (p. 183) illustrates a "Pirate craft off north point of Borneo" with a double outrigger consisting of three downwardly curved booms (Fig. 8); it was probably a Sulu vessel.

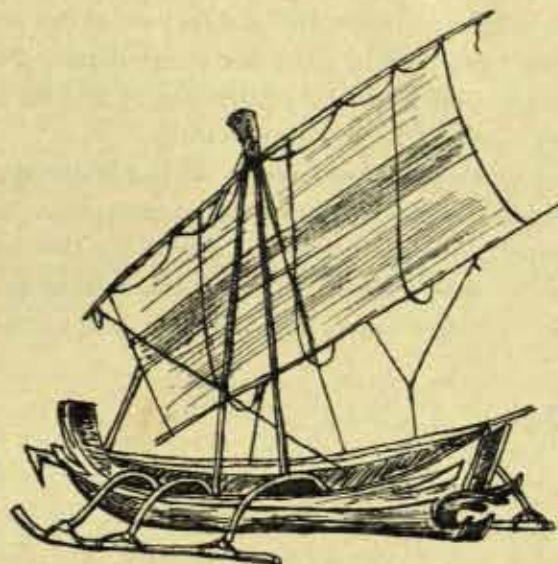


FIG. 8.—PIRATE CRAFT OFF NORTH POINT OF BORNEO  
(AFTER PRITCHETT, p. 183).

In the Philippines three booms may occur at Manila and on Lake Lanao in Mindanao (Vojnich, pp. 378, 383).

In numerous pictures of the East Indian seas given by old Dutch voyagers there are depicted large sailing war-vessels with massive outriggers possessing several (usually three) booms, on or under which are fastened a variable number of longitudinal planks (i.e., parallel to the hull) which are used as seats by the paddlers. I shall refer later to these craft and to the ancient Indo-Javanese vessels which had at least three booms to their outriggers. Weule figures (Pl. 112, Fig. 7) a double outrigger "Boot von den Molukken," but gives no further particulars; it has three booms and what may be a Moluccan attachment, a board is lashed to the underside of the booms midway between the hull and each float, on which three men sit and paddle.

Throughout Polynesia, with but few exceptions, the canoes have two outrigger-booms. Two straight booms are found in the Pelew, Marianne, and typically in the Caroline Groups; characteristic of the Marshall Group are two straight booms, the end of each of which is supported by a straight stick which is inserted into the float and apparently also into the boom, on each side of the booms are three curved



booms, the ends of which are lashed to the float (Model, Salem Museum ; Alexander, pl. 36, pp. 805, 806), a variant from Nonuti, Gilbert Islands, is shown in Fig. 29 see also p. 124. Equally characteristic is the presence of three (or four) outrigger-booms in Melanesia, but in New Guinea there is considerable diversity. In all of these areas there is a single outrigger, with the exceptions noted on pp. 79, 122 ; in those cases where the outrigger is double there are but two booms.

The only instances known to me in Indonesia of but one outrigger-boom are those associated with a single outrigger in a toy boat from Borneo (Fig. 32), and in the case recorded by Hornell from North Java (1919, Fig. 1), and the model from Manila (p. 114, Figs. 30, 31) in which the outrigger is double.

Professor J. Stanley Gardiner has given to the Cambridge Museum a toy canoe, *abbuodi*, from the Maldive Islands. It has a single outrigger and only one boom, the end of which is morticed into the float. He informs me that boys frequently use canoes with one, two, or three booms. The men's canoes have no outrigger, but the old people say that outrigger canoes were formerly used extensively ; one man called them "rafts."

There is a model in the Peabody Museum, Salem, Mass., of a canoe from Ruk, Caroline Group, with a long single boom on one side only which is strengthened by two horizontal convergent sticks from the fore and aft quarters of the hull ; there are two central parallel short ridges on the canoe-shaped float, the boom rests in a notch in the inner one and is inserted into a hole in the outer one. Müller (1917, I, Fig. 295, p. 199) gives an illustration of a toy sailing canoe, *tätärëg*, from Yap in the same group ; it is something similar to the preceding one, but there is an obscure indirect attachment. The play-boat figured by Krämer (1906, p. 291) from the Gilbert Islands appears to be very similar.

#### THE ATTACHMENT OF THE BOOMS TO THE HULL.

In the majority of cases the booms rest on the gunwales, especially when the hull consists solely of a dug-out. In the Andamans, however, the booms pass through holes in both sides of the dug-out (Fig. 11, A, D).

It not infrequently happens that a length of sapling or bamboo is lashed to the upper border of the dug-out and the booms rest on this *gunwale spar*, as it may be termed. The object of this spar is obviously to protect the edges of the hull ; it is widely distributed in Oceania.

In the Nicobars, according to A. R. Brown MS., the booms rest on the gunwales and a gunwale spar is fastened over them along the length of the canoe (Fig. 10, B), but Svoboda (VI, Pl. 1) figures the ordinary arrangement.

Sometimes the booms lodge in notches in the gunwale, or the gunwale may be locally raised at the spots which support the booms ; the upper edges of these protuberances may be notched.



## THE FLOAT.

The float usually consists of a single log of wood or piece of bamboo. When not otherwise stated it may be assumed that the float is single, but occasionally two or more bamboos (or pieces of wood) are employed, in which case it may be termed a *double, treble, or multiple float*.

The float, when made of bamboo, has its ends cut square, but when made of wood it is usually trimmed; the fore end only or both ends may be pointed, or the fore end and occasionally both ends may have an upward curve.

THE ATTACHMENTS BETWEEN THE BOOMS AND THE FLOAT AND THEIR DISTRIBUTION.<sup>1</sup>

There are various methods in the attachment between the booms and the float. The main groups are:—

A.—*Direct.*

1. *Inserted*.—The ends of both booms are inserted into the float. This appears to be very rare, if it actually does occur in practice, in Indonesia. According to Folkard's drawing (p. 480) the Sumatran *jellore* and *ballellang* have booms with downwardly curved ends which appear to be inserted into the floats; unfortunately the drawings in his book are on too small a scale for the details of attachment to be reliable. The toy boats of Sarawak (Fig. 32) have this method. The Balinese attachment (p. 88) really belongs here.

2. *Lashed*.—The ends of all the booms are lashed to the float (Figs. 1, 2, 5, 7). This type is widely spread throughout Indonesia. It has been noted at Mentawai (Rosenberg, Pl. XVIII, Fig. 9); Engano (model, Leiden); Palembang in Sumatra (model, Amsterdam); Madura (model, Amsterdam; model, Leiden, in this case each float consists of two bamboos between which is a small peg which projects on the under and upper surfaces of the boom, evidently to render the lashing more secure); Java (L., I, p. 35b); Bali (Fr., II, p. 235, Fig. 1, on a *dyukun* canoe); Sumba or Sandalwood Island (model, Amsterdam); Lomblen, between Flores and Timor (model, Leiden); Baba, west of Tenimber (Pflüger, p. 145, no description); freshwater creek of Totoat, Kei Islands (Langen, p. 52, poor figure, no description); Lintschotus illustrates a sailing vessel apparently of this type with the inscription "Navium quibus Bantani utunter" (Tertia pars, DCI, XXIIXh), but the booms may have been inserted into the float; Lake Wakollo or Wakoholo, Buru (Forbes, Pl. p. 405, no description; K. Martin, 1894, p. 329, Pl. XLV, with three slightly curved booms); Batjan (G., No. 336); Ternate (L., II, Pls. 14, 15; Kükenthal, Pl. 7, Fig. 13, obscure, no description); Lake Galela in North Halmahera (Kükenthal, p. 172); Makassar (Valentijn, No. 23, p. 136); Gowa in South Celebes (model, Leiden); Paloppo and Libukang in the Gulf of Boni, Celebes (P. and F. Sarasin,

<sup>1</sup> Map, p. 71. The distribution outside of Indonesia is given later, p. 124.



1905, I, Fig. 53; II, Figs. 62, 63); Ussu on the Malili River and Lake Matanna, at the north-east end of the Gulf of Boni and Paloppo (Grubauer, Figs. 15, 38, 39, 108); Kema, North Celebes (G., No. 62); Sangir (model, Amsterdam, single outrigger with two booms and an outlayer, Fig. 5); Talaut Islands ("Geisterkahn" or *sakit* canoe, Dresden, Meyer and Richter, Pl. I, Fig. 10); Sulu Islands (Wilkes, Vol. V., p. 333; Burbidge, p. 225; Savage Landor, II, pp. 2, 12; Müller, p. 244, Fig. 55; Guillemard, 1889, pp. 192, 206; G., Nos. 4, 142, 180, 211, 217); Cagayanes Group (Savage Landor, I, p. 228); Manila and district of Lake Lanao, Mindanao (Vojnich, pp. 378, 383); Pasig River, Manila (p. 114, Fig. 30); Zamboanga and Zebu (Müller, p. 244, Fig. 57); the "Pirate craft off north point of Borneo" (Fig. 8) (Pritchett, p. 183) appears to belong here.

In a large canoe at Amboina figured by Valentijn (No. XXX, p. 124) the booms seem to be lashed directly to the float, they have a zigzag appearance and support planks for paddlers, but the illustration is not convincing.

3. *Mixed Direct Attachment*.—A model of a fishing boat, *sampan*, from Panarukan, Madura Strait, in the Rotterdam Museum, has two booms, one of which is straight and tied to the float, while the other is downwardly curved and inserted into the float. Practically the same arrangement is shown in a model from "Java" in the Amsterdam Museum (Fig. 9). In the Leiden Museum are two models from Madura, in which the fore boom is straight with its ends lashed to the floats, while the aft boom is short and straight and has inserted into each end a straight spar with a downwardly

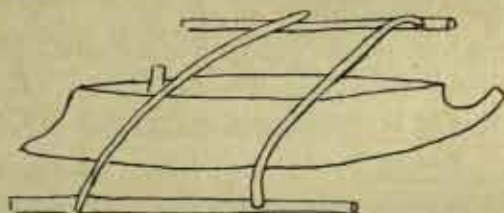


FIG. 9.—MODEL WITH DOUBLE OUTRIGGER AND MIXED DIRECT ATTACHMENT, JAVA (AMSTERDAM).

curved end which is inserted into the float; these booms are probably intended to represent a *sedek* (p. 89), and if so this is an example of a *mixed direct and Balinese attachment*. I think in all these cases it is the fore boom which is lashed to and the aft boom which is inserted into the float.

A model of a large plank boat in the Leiden Museum from Gowa, South Celebes, has five booms of which the fore and aft booms are inserted into the float, while the three middle ones are lashed to the underside of the float (pp. 80, 106, 113, 114).

#### B.—*Indirect.*

##### (a) *Attachment inserted into the Float.*

*Stick Attachment*.—Attachments which consist of one, two, or more sticks, one end of each stick is lashed to the boom while the other is inserted into the float.



The sticks may be *vertical*, in which case there may be only a single stick, or there may be two or more sticks, either on one or on both sides of the boom; the sticks may be irregularly *oblique*, in oblique parallel pairs or a pair of oblique sticks may *converge* over the boom; a pair of sticks may cross under the boom, *undercrossed*, in which case the boom typically rests on the crossing, or the crossing may take place over the boom, *overcrossed*.

In the outrigger canoe, *duē*, of the Nicobars the attachment consists typically of a double set of three sticks, *heneme*, which are inserted into the float, *hentaha*, and lashed to the boom, *deia due*, in such a way that two sticks generally cross each other below the boom, while the third may be vertical or oblique, and may be fore or aft of the boom (Fig. 10, C, D); occasionally a pair of sticks converge over the boom, the third being more oblique (Fig. 10, F). The two sets of three sticks diverge from the median line of the float (Fig. 10, A). Sometimes there is also a central pair of undercrossed sticks, which is inserted vertically between these two, as in

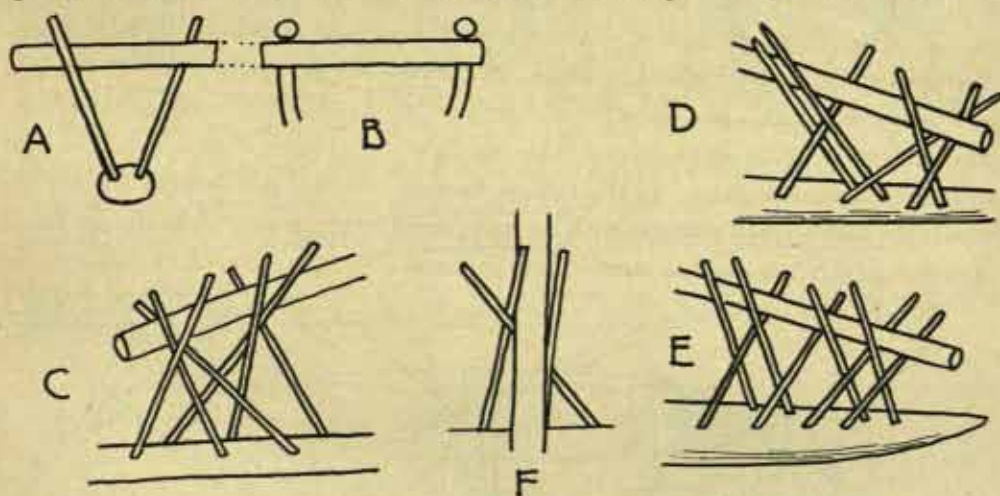


FIG. 10.—STICK ATTACHMENTS, NICOBARS: A-C (A. R. BROWN MS.) C, REPRESENTS THE ARRANGEMENT OF THE STICKS; IN A, ONLY TWO OF THE SIX STICKS ARE SHOWN; D, E, MODELS (OXFORD); F, MODEL (EDINBURGH).

models in the Oxford Museum (Fig. 10, E). In a model in the Edinburgh Museum one set consists of two sticks which are almost parallel and converge slightly over the boom and a third oblique stick (Fig. 10, F).

The native names are taken from Svoboda, who does not describe the arrangement of the sticks, nor are his figures at all clear (VI, Pl. I, Figs. 11, 17); he also gives an illustration (V, p. 193) of a toy canoe in which both booms pass through the hull and rest on the float and are tied to an adjacent short peg which is inserted into the float. A good illustration of a model of a sailing canoe, which shows the details of the sticks, is given by Man (XI, Pl. XXIV), later (XV, pp. 436, 449) he alludes to Nicobarese canoes without saying anything about outriggers. Kloss (pp. 53, 79) gives short accounts of the canoes, *áp*, and two excellent plates (pp. 80, 154);



the latter shows the attachments very well, as does the plate, p. 345, *Journ. Anthropol. Inst.*, VI, 1877, cf. p. 209.

The Andamanese attachment consists most frequently of one set of two under-crossed sticks and one vertical stick, which may be on either side of the boom (Fig. 11, B). This arrangement occurs in one attachment in a model in the Cambridge Museum, while in the other two attachments two sticks cross over the boom and a third vertical stick is present (Fig. 11, D). In a model in the Horniman Museum the three booms each have an attachment of only two sticks which converge over the boom. Models in the British Museum, Oxford, and Edinburgh Museums, have three booms with a single pair of oblique sticks which cross under the boom (Fig. 11, E).

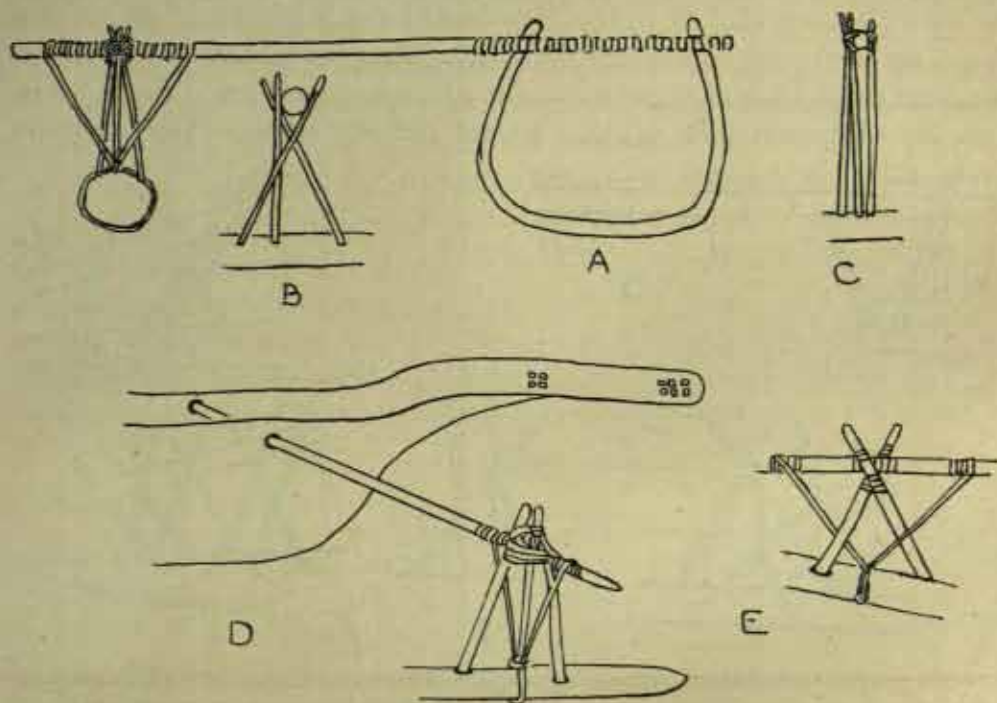


FIG. 11.—STICK ATTACHMENTS, ANDAMANS: A, B, GREAT ANDAMAN, C, LITTLE ANDAMAN (A. R. BROWN MS.); D, MODEL (CAMBRIDGE); E, MODEL (BRITISH MUSEUM).

In the Little Andaman (A. R. Brown MS.) there are three vertical sticks, two on one side of the boom and one on the other. There is, however, some variation in the arrangement in the various models, even in the attachments of the several booms in the same model; for example, in the Halifax Museum, a model of a large canoe, *roko*, has three booms—the attachment of two is typical, while in the third the boom passes between a pair of crossed sticks and the vertical stick, but this is probably due to careless workmanship. There is frequently in addition a couple of lashings (Fig. 11, A, D, E) or a single one, of ratan from the boom to the float to render the attachment more secure. A good photograph of an outrigger canoe, *chá-rigma*, and of the larger kind without outriggers, *gi lyanga*, is given by Man (XII, p. 116, Pl. VII).

With these exceptions, a stick attachment of this kind has not been recorded for Indonesia, though, as we shall see (p. 125), it is very common in Oceania.

*Rod Attachment.*—This attachment, which consists of a more or less vertical rod or stick inserted into the float at its lower end, has not hitherto been recorded from Indonesia as an attachment for all of the booms of a canoe. That it may have occurred there is possible, as it is found in some mixed types (pp. 92, 96). To avoid confusion with the above-mentioned stick attachment this may conveniently be termed a "rod attachment."

*Spike Attachment* (pp. 79, 127). *Y-shaped Stick Attachment* (p. 127).

*Board Attachment.*—Hornell has recently described a form of attachment to which the term "board" may be applied (1919, No. 55). It consists of a short, broad and relatively thin piece of wood; its lower end is inserted into the float while the boom passes through its upper end; in these two respects it resembles the more stick-like attachment of the East African canoes (pp. 79, 128; Haddon, 1918, No. 29). This attachment has been recorded only from the north coast of Middle Java, where it is associated with a single outrigger and a single boom. It seems to be related, however, to an attachment figured by Nicolas (1601, II, Pls. 14, 15, 17) on trading- and war-vessels at Ternate (p. 110) and by De Bry (1601, V, Pls. XII, XVI) on similar craft from the Moluccas. At that time the larger boats of the Moluccas had a double outrigger of three stout straight booms, each of which was supported in a deep notch in a short board which was apparently inserted into the float (Fig. 12 B). I propose to refer to this type as a *Y-board attachment*. Valentijn

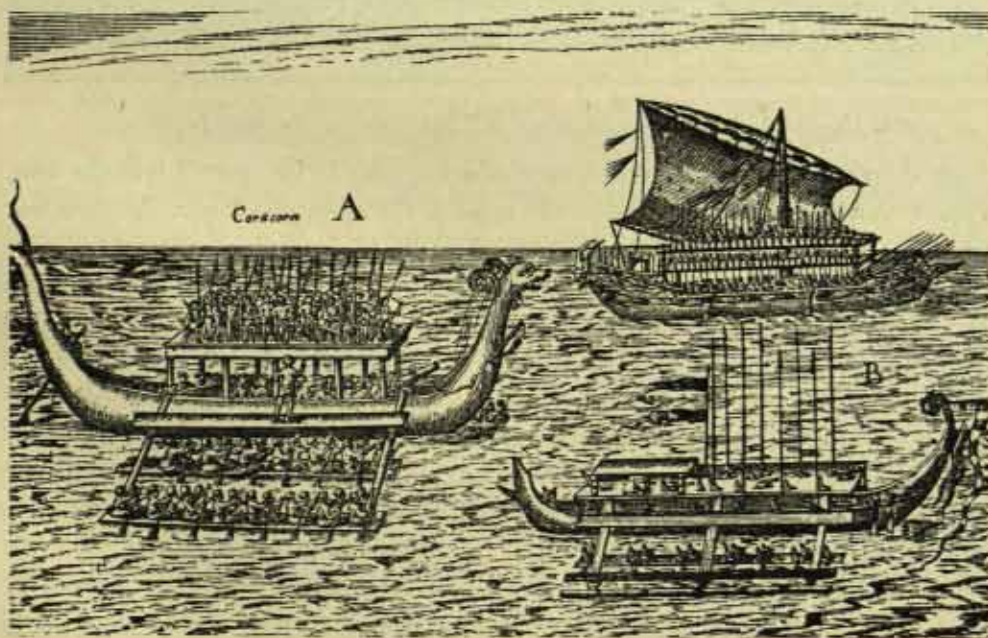


FIG. 12.—"CORACORA A," THE DOUBLE OUTRIGGER HAS A FLOAT CONSISTING OF TWO PLANKS; B, "THE KARKOLLA OF THE KING OF TERNATE," WITH A Y-BOARD ATTACHMENT; ABOVE THIS IS A MADURA WAR SHIP. (DE BRY; AND NICOLAS, 1601, pl. 9, p. 116.)



(p. 363) shows these boards as also lashed to the floats on Moluccan vessels. A thick longitudinal spar or board ran across the ends of the booms, presumably to keep them in place, this was frequently utilized as a seat for paddlers. In one *coracora* there was apparently a straight Halmaheran attachment near each end of the longitudinal spar. Generally one or two planks are fastened transversely to the booms upon which men sit to paddle. In an illustration entitled "*De Cora-cora van Titaway*" (Fig. 13) there are six outrigger booms which are supported by as

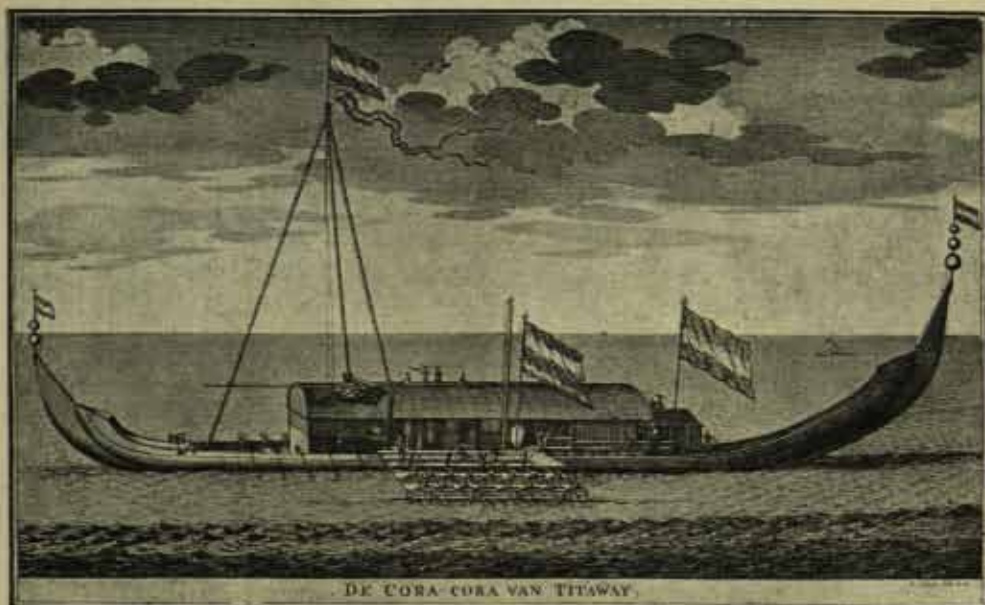


FIG. 13.—"*DE CORA-CORA VAN TITAWAY*" (VALENTIJN, No. XLII, p. 184).

many short, thick, squared bars of wood which appear to be inserted into the float, a plank on which eight men sit to paddle replaces the longitudinal spar, there are four other similar planks on the lowermost of which are also paddlers.

*Balinese Attachment.*—We may adopt Hornell's term for the type of attachment which consists of a straight or slightly curved spar one end of which is spliced, pegged and lashed to each end of both of the short straight booms, the other being inserted into the float and reinforced by lashing (1919, No. 55). This type was first described and figured by Friederici (II, p. 235, Fig. 2) (Fig. 14 A), who gives the Bali names for

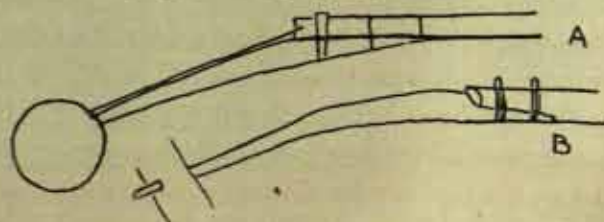


FIG. 14.—BALINESE ATTACHMENT: A, BALI (FRIEDERICI, II, fig. 2); B, MODEL FROM BANJUWANGI, E. JAVA (EDINBURGH).



boom, *brayunan*, "intermediate piece," *sedek*, and float, *kater*. Hornell gives a good photograph (1919, Pl. G., A) of a Lombok canoe, and figures details of the *sedek* from Boleleng, Bali. There is a model of a sailing boat, *dukong*, from Banjuwangi, Java, on the Bali Strait, in the Edinburgh Museum with this attachment (Fig. 14 B).

Hornell suggests that this is a device for extending the boom downwards so as to save the necessity for searching for a naturally-bent piece of wood with which to construct an outrigger-boom of the required form. As I have stated (p. 73), the *sedek* may be regarded as one form of the "boom-prolongation." If the *sedek* were a form of Halmaheran attachment one would expect it to be only lashed to the float, whereas it is inserted into it, as it appropriately would be if it were derived from a direct inserted attachment; the upper end is virtually an integral part of the boom and not a spar lashed on to it. As the *sedek* is an added piece, this form of attachment is strictly speaking "indirect," but if it be regarded merely as a prolongation of the boom it should be described as a "direct inserted attachment."

(b) *Attachment tied to the Float.*

*Moluccan.*—The typical Moluccan attachment is formed by a U-shaped piece of ratan, the horns of which are lashed to one side of the free end of each of the booms, and the base is lashed to the float (Figs. 3, 15).

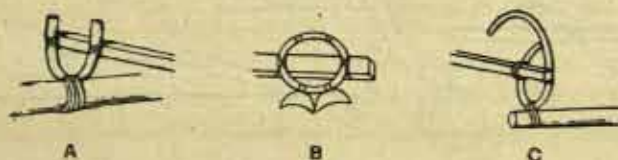


FIG. 15.—MOLUCCAN ATTACHMENTS: A, BATJAN; B, AMBOINA; C, BANDA (A, C, FROM PHOTOGRAPHS, G., 334, 161; B, AFTER FRIEDERICI, II, fig. 7a).

It has been noted from models at Wetta (Riedel, Pls. XLI, Fig. 12; XLIII, Fig. 8, Baessler, p. 78, Pl. VII, Fig. 4); Batu mera in the south-east islands of the Kei Group (model, Amsterdam); Buru (Riedel, from model, Pl. I; Fr., "here and there," III, p. 161); Amboina (K. Martin, 1894, p. 232; Fr., II, Fig. 7a, p. 237; model, Leiden, on aft side of all the booms); Uliassers (Fr., III, p. 161); Ceram (Fr., III, p. 161, "with the exception of a few places on the north coast"; South Ceram, K. Martin, 1894, p. 232, Pls. XII, XXVIII, Fig. 15); Ombi, north of Ceram (Fr., II, p. 239); Batjan (Fr., II, p. 239, "predominates"; G., Nos. 328, 331, 334, 336); Ternate (Kükenthal, Pl. 5, Fig. 8; Fr., II, Fig. 11, p. 240, "greatly predominates"; G., No. 327); northern Halmahera ("occasionally" at Ake-Selaka, Tobelo and Galela, Fr., II, pp. 240, 242, Figs. 11, 27a; III, p. 161); Buton (Fr., II, Fig. 3, usually with three booms and three bamboos to form the float, p. 235).

Other varieties of this type are the O-shaped attachment which predominates at Amboina (Fr., II, p. 237; Pflüger, p. 131; models, Leiden), and the 6-shaped attachment which is the common form at Banda (Fr., II, p. 237; G., No. 161).



The Moluccan attachments of boats between Selang and Batjan figured by Forrest (pl. 4, p. 82, pl. 5, p. 86) are not very clear; the former is a "Molucca Corocoro," and has three booms, a tripod mast and a *lyre tanjong* sail.

*Halmaheran*.—This attachment consists of a variously shaped spar which is lashed above to a boom and below to the float (Figs. 4, 6, 16, 17).

In order to prevent confusion with the "stick" attachment, which is *inserted* into the float, I propose to refer to this element as a "spar," even when it is a simple rod or stick. This is the "oblique" or "elbow-stanchion type" of Hornell. The term "Halmaheira-Verbindung," like that of "Molukken-Verbindung," was introduced by Friederici (II, p. 239).

The simplest condition consists of a straight spar which may be vertical, as in a Batjan canoe (Fig. 16 F; G., 336) and in a sailing vessel, *bero*, at the Tenimber Islands (Riedel, Pl. XXVII, Fig. 9, I assume that the spar is tied to and not inserted into

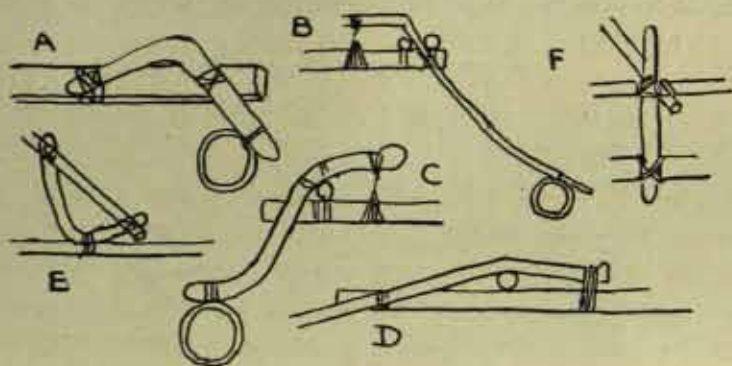


FIG. 16.—HALMAHERAN ATTACHMENTS: A, BUTON; B, C, AKKE SELAKA, AND D, WEDA BAY, HALMAHEBA (FRIEDERICI II, pp. 235 ff., figs. 4, 22, 17, 27); E, MODEL FROM TALAUT (AMSTERDAM); F, BATCHAN (PHOTO G., 336).

the float in this case); or oblique, as in a canoe on the Bay of Bara, north coast of Buru (K. Martin, 1903, Pl. XIV) and Banda (G., 346). The attachment of the central booms of the Sangir canoe (Fig. 2, D) may be a variant.

The spar may be forked and practically horizontal (model from Tenimber, Leiden), p. 76 and Fig. 4; usually it is more or less vertical, Batjan (G., Nos. 328, 331), Misol (G., No. 267) or oblique, North Ceram (K. Martin, 1894, Pl. XXVIII, Fig. 16).

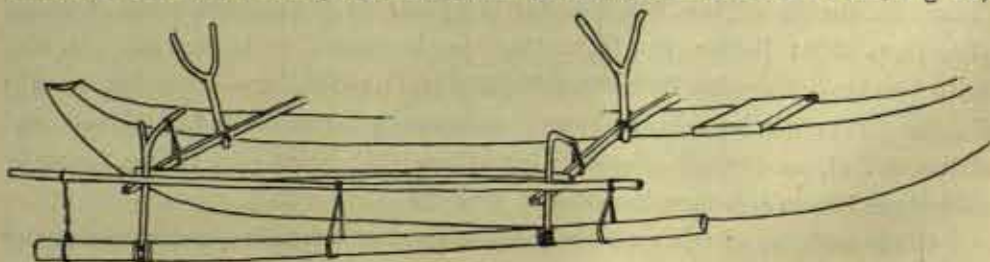


FIG. 17.—CANOE WITH DOUBLE OUTRIGGER, HALMAHERAN ATTACHMENT, AND AN INNER AND AN OUTER LONGITUDINAL SPAR, BATJAN (FROM PHOTO G., 331).



Most frequently the spars are angled, elbowed, or bent in various ways (Fig. 16). If the main stem of a forked spar were cut off immediately above the fork an angled spar would result. The stem may be straight and the upper part bowed (Fig. 6); the spar may have a slight sigmoid flexure, which may be so slight as to be almost straight. Occasionally the spar is sharply bent, with the ends pointing downwards, as in a Buton canoe (Fr., II, p. 235, Fig. 4), or with the ends pointing upwards as in a model from Talaut in the Amsterdam Museum (Figs. 16 A and E).

These variations, so far as my data go, do not appear to be significant as regards form or distribution, since nearly every variety occurs on the coasts of or on the islands immediately adjacent to Celebes, and elsewhere several varieties are found in the same spot; sometimes two varieties may be found on a single canoe.

It occurs at Lombok ("common," Hornell, p. 99); Timor (photo.); ? Baba (Pflüger, p. 147); Tenimber (Riedel, model, Pl. XXVII, Fig. 9; model, Leiden); Dobbo, Aru Islands (O. Warburg photo. in Krieger, Pl. 29); Buru (K. Martin, 1894, Pl. XLVI, 1903, Pl. XIV; Hornell, p. 99); Banda and Ambon ("occasionally," Fr., II, p. 239); Ceram, north coast (K. Martin, 1894, p. 232, Pl. XXVIII, Fig. 16; Fr., II, p. 239; Hornell, p. 99); Misol (G., No. 267); Ombi (Obi) (Fr., II, p. 239, "common type"; Hornell, p. 99); Batjan ("a few," Fr., p. 239; G., Nos. 328, 331, 336); Tidore (K. Martin, 1894, p. 233); Ternate (model, Leiden); Halmahera: Weda Bay (Fr., II, p. 242, Fig. 27), Ake Selaka (Fr., pp. 240, 243, Figs. 17, 22, 23), Patani and Buli (two booms, often with a central false-boom, Fr., p. 242), Tobelo and Galela ("greatly predominates," Fr., pp. 240, 242); Xulla, or Sula (K. Martin, 1894, p. 233; Fr., III, p. 161; Hornell, p. 99); Buton (Fr., pp. 235, 239, Fig. 4); Celebes: Makassar (R. Martin, 1894, p. 233); Gowa (model, Leiden); Konawéha River, South-east Celebes (Sarasén, I, p. 376, photo, but no description); Malili River, at the north-east corner of the head of the Gulf of Boni (Grubauer, Figs. 8, 10); Gulf of Gorontalo or Tomini: Pogoyama (G., No. 242), Todjo, Gulf of Tomini (Adriani and Kruyt, No. 9, Chap. 5); Minahassa (Dumont d'Urville *L'Astrolabe*, Atlas, Pls. 192, 204), Kema (G., No. 232), Limbé Island (Guillemard, Pl. p. 325); Menado (Hornell, Pl. G, B, and Fig. 3; models, Leiden); Tontoli (Toli-Toli), North-west Celebes (Pflüger, p. 85).

Although they are nominally beyond the scope of this paper, the outrigger canoes of North-west New Guinea must be alluded to as they differ from those of other parts of New Guinea and undoubtedly are of direct Indonesian origin, and can be perfectly matched by a type from Weda Bay in Halmahera (Fig. 6). So far as I can gather, but one type of outrigger extends from Skroë to Waigiu and possibly to Manukwari (Dorei) at the westerly opening of Geelvink Bay, where and further east it is replaced by other attachments.

At Skroë (a port founded by the Dutch in 1899 on the north shore of Telok Kampauer, i.e., on the south side of Onin Peninsula), judging from Pflüger's small and indistinct photograph (p. 171), the double outrigger has four booms, the two fore



and the two aft of which are nearer together than are the two central ones ; there is a Halmaheran attachment of the Waigiu type. Apparently, according to Pflüger's photographs (pp. 174, 175) a similar type occurs at Sēkar (Segaar) on the south shore of Telok Berow (Berou) or McClure Inlet, i.e., on the north side of Onin Peninsula ; Kreiger says they have very high boats with outriggers (p. 385). Dr. Guillemard's photographs (G., Nos. 305, 427, and 1889, p. 373) of canoes in Chabrol Bay, Waigiu (Waigöü), shows the same type of canoe as that recorded by Friederici (II, p. 248, Figs. 29, 30 ; Hornell, p. 99) at Saonek, an islet near the south coast of Waigiu and among the Sorong (Sorön) people on the island of Dom, who removed there in 1865 from Sorong, a village near Cape Spencer, or Kaap Noi, on the mainland of New Guinea (Fr., II, p. 248, Fig. 28 ; Hornell, p. 99). The dug-out or plank-built canoes have double outriggers. In the interior of the hull are transverse struts and lateral longitudinal spars as at Manukwari and Japen (Jobi) in Geelvink Bay to the east and at Halmahera to the west. The sides of the larger canoes are heightened by superimposed wash-strakes, and not by *gabbagabba* as in further east. The four booms of the outrigger stretch across the wash-strakes, to which they are lashed by means of ledges ("Leisten" or *patnati*), but in small canoes they rest directly on the edges of the dug-out. The two floats may be shorter than the hull, or, as in Sorong, like sledge-runners, and, as in Tahiti, run far forward, the last attachment spar being near its aft end. There is a Halmaheran attachment of a long fairly straight spar with a bent end, sometimes it is an elbowed spar ; an inner longitudinal spar passes over the four booms and underneath the angle of the spars. Friederici figures an attachment at Saonek with an additional outer longitudinal spar, the float in this instance is composed of two bamboos instead of the usual single one. The larger craft have a platform with side rails and an atap roof. On the booms, on both sides of the canoe, there are usually forked supports for gear, which have a crescentic or other form ; on one side lies the unshipped triangle-mast and on the other the rolled-up sail (Fr., II, p. 248).

### C.—*Mixed Attachments.*

In the foregoing accounts the attachments are similar on all the booms of a canoe. I now proceed to give examples of *mixed attachments*.

The *mixed direct attachment* and *mixed direct and Balinese attachment* have already been described (p. 84).

*Mixed Direct and Rod Attachment.*—Prichett (p. 175) gives a drawing (Fig. 18) of a sailing canoe, *sukung*, from Probolinggo, Madura Strait, in which the fore boom appears to be a boom-prolongation which is lashed to the float, or it may be that the boom is in one piece, but its diameter markedly varies in parts. The same applies to the aft boom except that the boom-prolongation is thicker and is upwardly curved with a swollen end, this is connected with the float by means of a rod which may be lashed to the boom or may pass through it ; the lower end appears to be inserted

into the float, but the drawing is not decisive as regards these two points. In referring to the "outrigger supports" he says, "The one forward being low down and

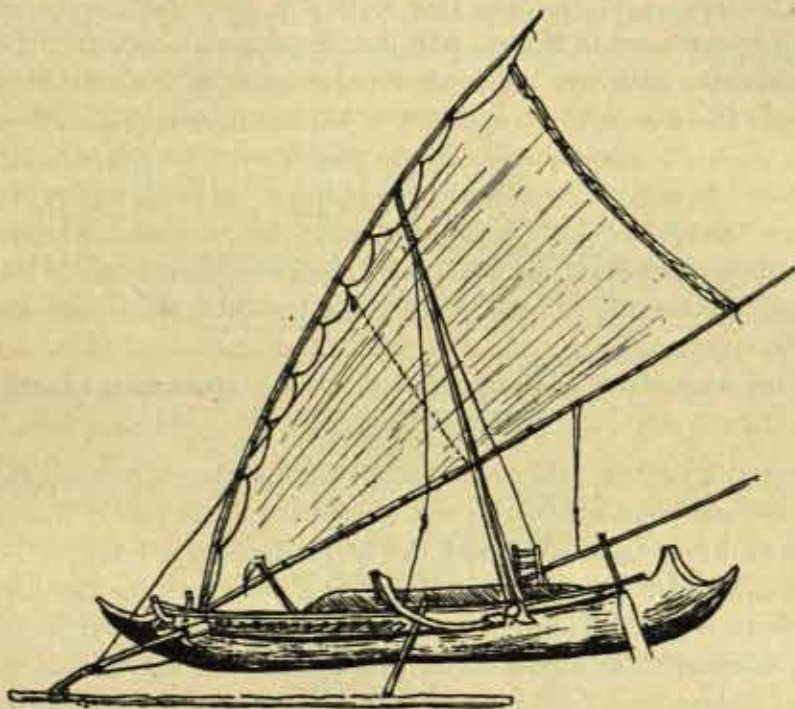


FIG. 18.—FISHING BOAT, *sukung*, WITH MIXED DIRECT AND ROD ATTACHMENT, PROBOLINGO, MADURA STRAIT (PRITCHETT, p. 175).

that aft curving up pronouncedly, to allow the wash to pass under freely when the vessel is at her high speed" (p. 174).

A model (Fig. 19) of a *sekong* in the Rotterdam Museum from Pasuruan, in Madura Strait, seems to clear up the points that are doubtful in Pritchett's drawing. Both of the short booms have a boom-prolongation, the fore one is lashed to the float, the

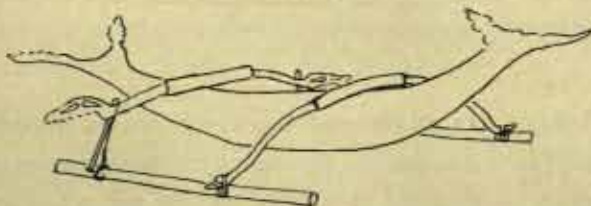


FIG. 19.—MODEL OF A *sekong* WITH MIXED DIRECT AND ROD ATTACHMENT, PASURAN, E. JAVA (ROTTERDAM).

free end of the aft one is expanded and decorated with fret carving, a rod passes through this boom-prolongation and is inserted into the float, a lashing also connects the boom and the float at this spot.



In a sketch by Müller (1912, p. 244, Fig. 22) of a canoe from Madura (Fig. 20), the fore boom is a doubly bent yoke-shaped bar, the ends of which are lashed to the floats; the aft boom, or boom-prolongation, is strongly curved upwardly, being almost U-shaped, each divergent limb being connected by means of a vertical T-

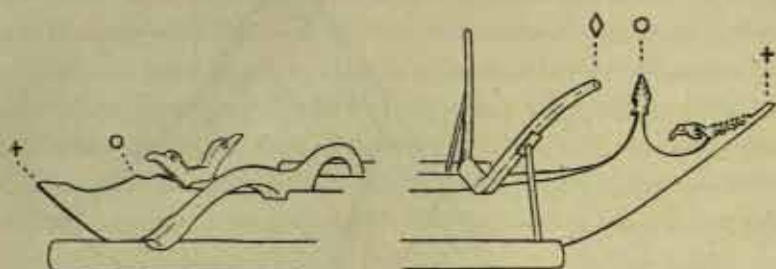


FIG. 20.—SKETCH OF A MIXED DIRECT AND ROD ATTACHMENT, MADURA  
(FROM MÜLLER, 1912, fig. 22).

shaped rod with the float; the transverse upper end of the rod is presumably lashed to the boom and probably its lower end is inserted into the float. Thus in all the main points the outrigger agrees with that of the Probolinggo boat.

The same author gives a sketch (Fig. 21) of a canoe from the Bawean Islands; the fore boom is straight, how it is attached to the float is not evident, but it is a direct attachment. The author states that at the stern the bamboo floats are suspended without spars (*Auslegerstange*) from an elastic bent rod which is concave above (p. 244). If, as his sketch indicates, this rod is all in one piece, it must be made of bent ratan, as it is inconceivable that the whole apparatus could be made out of

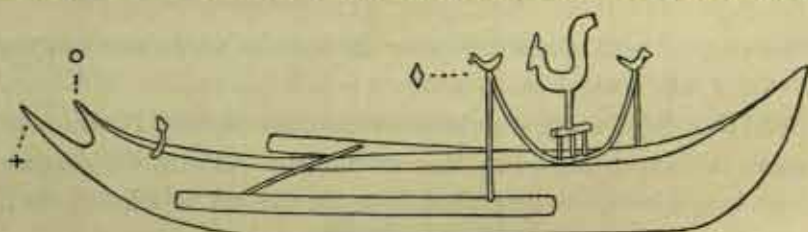


FIG. 21.—SKETCH OF A MIXED DIRECT AND ROD ATTACHMENT, BAWEAN ISLANDS  
(FROM MÜLLER, 1912, fig. 23).

a single piece of wood. In either case the form requires explanation; we may therefore suppose that it consists of the characteristically upwardly curved boom or boom-prolongation to each end of which a vertical rod is fastened, the lower end of which is apparently inserted into the boom; if this be so, it falls in with the previous examples. Müller states that he made these sketches whilst on board a steamer.

*Mixed Direct and Halmaheran Attachment.*—In the region embracing North Celebes, Banka, the Talaut (including Sangir) and Tulus Groups canoes have two outriggers and many of them have but two booms.

Friederici says: "In Minahassa there are outrigger boats whose fore boom is curved and—exactly as in Bali, Bugi, Makassar, at the Mariannes, in Tahiti and at the Marquesas—is fastened directly to the float, while the aft straight boom is connected by means of an S-shaped spar with the float, *sema*. According to the description of Graafland (*Minahassa*, II, pp. 404, 405) this might be considered as a Moluccan attachment, but it is really, as Dumont d'Urville's drawings (*Atlas*, Pl. 234, Figs. 1, 2) prove, the Halmaheran attachment" (III, p. 161).

Hickson gives a figure of a model of a sailing dug-out, *londi*, from Talisse in the Banka Strait (Fig. 1, p. 22). The fore boom is strongly curved and its ends are lashed to the floats which are generally made of two or three pieces of thick bamboo firmly lashed together. The aft boom is straight and its ends are connected with the floats

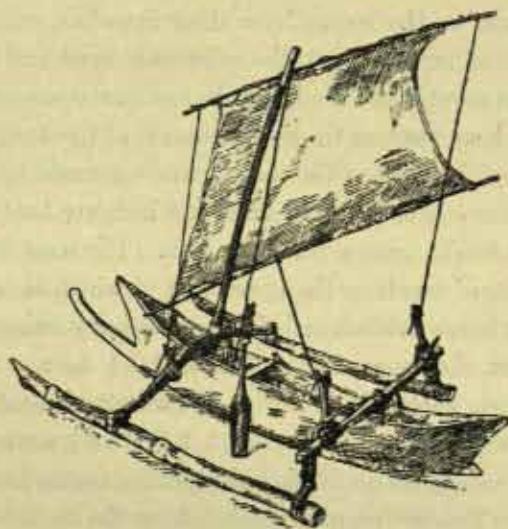


FIG. 22.—SAILING CANOE, *londi*, WITH MIXED DIRECT AND HALMAHERAN ATTACHMENT TALISSE ISLAND, N.E. CELEBES (HICKSON).

by means of an S-shaped Halmaheran attachment (Fig. 22). In some dug-outs at Kema, slightly to the south of Banka Strait, the fore-boom is downwardly curved with a direct lashed attachment, and the shorter straight aft boom is attached to the float by a bent Halmaheran spar (G., No. 67).

A model canoe from the Talaut Islands in the Amsterdam Museum has two straight booms, of which the fore one has a direct tied attachment and the aft one has a bent or bowed spar attachment, but in this case the free ends of the spar are lashed to the boom and the bend to the float, it thus bears some resemblance to the U-Moluccan attachment (Fig. 16 E). It may be a spar of this kind to which Graafland refers.

In Sangir, according to Müller (1912, *f.n.*, p. 244), the two outer (fore and aft) booms of the double outrigger and their boom-spars bend downwards and are



connected directly with the floats, whereas the central booms have the structure shown in Fig. 2, D, and have a **L**-shaped attachment spar, the lower end of which is lashed to the double floats.

There is a very remarkable model in the Oxford Museum, which was collected by Capt. J. P. Maclear of the "Challenger." The dug-out has notched ends, the upper part being prolonged into a short upwardly slanting beak, the lower part of the bow is produced into a long spur which rises in a gentle curve. There are two floats on each side, each of which has the ordinary pair of booms; the two fore booms lie very close together, as do the two aft booms. The fore booms have a direct lashed attachment. The outer float is attached to its aft boom with a bowed Halmaheran attachment, while the inner is attached to its aft boom by a **Y**-shaped Halmaheran attachment. The forks on the booms have three branches, one long and low down (like the brow tine of a deer's antler), the other two short and terminal. The fore forks are lashed to the stouter and hinder of the two fore booms, *i.e.*, the one attached to the inner float; a spar rests on the lowest branch of the fork and is lashed in its middle to the socket of the mast. The inner boom is secured by two lashings within the hull of the canoe to a cross-bar, the ends of which are kept in place by passing below projections left in the inner sides of the hull. The mast is stepped in a socket consisting of a section of bamboo, the upper end of which is lashed to the hinder fore boom, while the lower end is steadied by a cross-bar passing through it, the ends of which abut against the inner sides of the hull. I do not know of any other example of two floats on each side each with its own attachments, the double, treble or multiple floats previously noted (p. 83, figs. 1, 2 D, 15 B), are treated as if they were simple floats. There can be no doubt that the specimen came from the North Celebes area, possibly from the Talaut Group, or possibly from the Nanusa Islands as the ends of the canoe resemble those of the *sakit* canoes described by Hickson (*cf.* pp. 77, 113).

*Mixed Rod and Halmaheran Attachment.*—A photograph (G., No. 232) at Kema, Minahassa, North-east Celebes, shows a canoe with attachments which are distinct from any other known to me. At both ends of the canoe there is a framework consisting of a short straight boom, on which is an equally short upwardly curved spar, or boom-spar, these are braced by two vertical sticks. At what is presumably the fore end of the canoe there is a vertical rod which is fastened to the ends of its boom

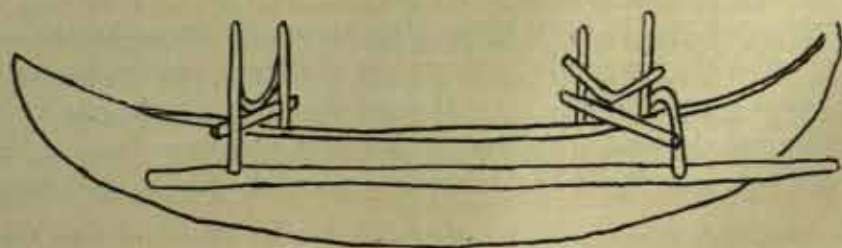


FIG. 23.—MIXED ROD AND HALMAHERAN ATTACHMENT KEMA, N.E. CELEBES  
(PHOTO G., 232).



and curved boom-spar and appears to be inserted into the float. At the other end the rod is replaced by a bent spar, which appears to be a true Halmaheran attachment, as it is lashed to the float. The first of these attachments somewhat resembles the aft attachment of the Bawean canoe (Fig. 21). This Kema type can easily be resolved into the Sangir type (Fig. 2, D) if the booms and upwardly curved boom-spars of the latter were greatly shortened and the oblique sticks or stays were placed vertically. The straight rod also corresponds fairly closely with the  $\perp$ -shaped spar of the Sangir type, except perhaps for its attachment to the float.

#### NOTES ON THE CHARACTERISTIC OUTRIGGER CANOES OF THE MAIN DISTRICTS OF INDONESIA.

The outrigger canoes of the Andamans and Nicobars have been sufficiently dealt with on pp. 79, 80, 85, 86. The main point to remember is that in both groups there is an inserted stick attachment, but in the Andamans the single outrigger has several booms, while in the Nicobars it has but two.

There is a marked absence of outriggers from the greater part of Sumatra and Java and from the whole of Borneo, which is evidently due to a knowledge of the art of building sea-going plank boats and ships, which have supplanted the older types, as has occurred in the Kei Islands. The general absence of outriggers from the small craft of the harbours and rivers of Borneo is not so easy of explanation. I feel considerable hesitation, however, in making definite statements concerning the distribution of outrigger canoes in certain areas, as I have been able to find very little positive evidence one way or the other, and negative evidence is full of pitfalls.

According to Modigliani, canoes are very rare in Nias, and he does not mention an outrigger (1890, p. 418); other authors do not appear to mention them either.

Rosenberg (1878, I, p. 176) figures a canoe, *abak*, from Mentawai, with a single outrigger, two booms and a direct lashed attachment. The Mentawai war-ship, *knabat bogolu*, figured by Rosenberg (1888, Pl. VIII, Fig. 9), is referred to on pp. 74, 78, 83; it has apparently a single outrigger which is on the starboard side and a direct lashed attachment.

Modigliani describes the simple but seaworthy canoes, *eloha*, of Engano; they are dug-outs with a double outrigger which rests in four deep notches in the gunwale (1894, p. 206). A model in the Leiden Museum shows two booms and floats far away from the hull with a direct tied attachment. Giglioli, in describing the specimens collected by Modigliani, says: "These are long narrow dug-outs [*cobara-eloha*], made from a single tree-trunk, with two outriggers; the cross-pieces or seats are often beautifully carved, the usual figure being that of a man with arms and legs extended as if to keep apart the sides of the canoe; grotesque figures *in-coitu* or that of a frog being swallowed by a snake are amongst the specimens of these quaint Engano



boat seats. No sails are used, and the paddles are plain and of the usual type" (1893, p. 131).

At the present day, outriggers appear to be scarce in Sumatra. Friederici (II, p. 235) states that outriggers have almost disappeared in the Singapore, Banka and Biliton areas. Dampier narrates in his *Voyages* that the Nicobar canoe in which he sailed to Achin had "good outlayers lashed very fast and firm on each side the vessel, being made of strong poles. So that while these continued firm, the vessel could not overset . . . we were therefore much beholden to our Achinese companions for this contrivance" (quoted from Kloss, pp. 267, 268). This was in 1688; that the "outlayers" were true outriggers and not outlayers (p. 76) seems probable, as in his description of his visit to the Nicobars, Dampier speaks of the "small slight outlayers on one side" of the local canoes (*loc. cit.*, p. 260), and, as we have seen (p. 78), the Nicobarese canoes have single outriggers or none at all. Folkard (p. 480) refers to the long narrow *jellore* and *ballelang* of Sumatra which "are fitted with double outriggers, which stand out a considerable distance from the sides." He figures a *jellore* with the sail partly furled, the ends of the two booms curve downwardly and apparently are inserted into the floats. Folkard does not say where he saw these craft, probably it was on the coast of the Palembang district; he adds, "jellores have sometimes only one outrigger." Other sailing vessels without outriggers are the *panchallang* and the *bantang*. In the Amsterdam Museum there is a model of a canoe from Palembang with a double outrigger, two booms and a direct tied attachment. Giglioli (1893, p. 116 and Fig. 8) describes the Batak *solu* dug-outs with a wash-strake but no outrigger; the bow and stern decorations are noteworthy, they consist of sticks with tufts of hair and a central phallus; the bow in addition has a wooden carved and painted buffalo head. Brenner (1894, p. 284) refers to two kinds of keel-less dug-outs among the Batak of Lake Toba, the *solu ratsaran* or fishing canoe, and the *solu bolon* for trade and war; some of the latter, he says, are provided with an outrigger, but he gives neither an illustration nor a description. Fischer (p. 114) refers to a model in the Leiden Museum of a sail boat, *djongkang*, from Padang, with a double outrigger of two feeble bowed booms; Dr. Juynboll informs me that these are half inserted and attached by a nail to the float.

Hornell's observation that North-Central Java is a locality where the outrigger pattern of canoe has long been discarded in favour of properly built boats (1919, p. 98) supports Friederici's remark that outriggers have almost disappeared from the Javan coasts (II, p. 235). References have been made (pp. 82, 87) to a degenerate canoe from North Java described by Hornell.

There is a distinct type of attachment in the Eastern Javan area (Madura Strait, Madura, and the Bawean Islands) which has already been described (pp. 92-94, Figs. 18-21). Müller remarks (p. 244) that the Bawean and Madura boats are quite isolated in the western archipelago, and only find affinities in the extreme east in the



South Philippine local group. In both areas the fore boom has a direct attachment, while the aft boom has an indirect attachment. Müller takes the Sangir model (Fig. 2, D) as a parent type from which the Eastern Javan and South Philippine types have diverged, and appears to regard the upwardly curved aft booms of the Javan boats as the equivalent of the upwardly curved "Bügel" (boom-spars, p. 73) of the South Philippine area (Figs. 2, A, and 7). It seems to me much more reasonable to regard them as true booms, or boom-prolongations, which are recurved, and not as reduced boom-spars of the Sangir model, of which the outrigger-boom and oblique stays have disappeared. In my opinion a much closer analogy is to be met with in the Northern Celeban types illustrated by Figs. 22 and 23, the main difference being that in the latter the attachment spar is tied to the float as in the ordinary Halmaheran attachment, whereas in the Eastern Javan type the attachment rod appears to be always inserted into the float. The rod-attachment of the Kema (North Celebes) canoe is associated, as we have seen (p. 96), with a Halmaheran attachment. The Eastern Javan area is contiguous to and partly overlapped by that of the Balinese attachment (p. 88). Juynboll describes (p. 37) a model in the Leiden Museum of a trading vessel (Madura, *paduwang* from East Java) with a double outrigger of two booms which are tied to the float.

In Madura and Bali the attachment may be direct and lashed (p. 83). In Madura Strait the straight fore-boom may be lashed to and the curved aft boom inserted into the float—i.e., a mixed direct attachment (p. 84). Typical of Bali is the Balinese attachment, which consists of a spar rigidly fastened by one end to the boom, the other end being inserted into the float; it also occurs at Lombok (p. 88). A mixed direct lashed and Balinese attachment occurs at Madura (p. 84). A mixed direct lashed and rod-attachment occurs in Madura Strait and at the Bawean Islands, the rod being lashed to or inserted through the boom and inserted into the float (p. 92).

We may thus define an *Eastern Javanese area* which includes the extreme eastern end of that island, Madura, Bawean, and Bali, and is characterized by the occurrence of attachments which form a gradation of types: (1) In Bali both booms have the *sedek*. (2) The fore boom is lashed directly to the float; the aft boom is (a) inserted into the float, (b) a prolongation of it, the *sedek*, is inserted into the float, (c) a rod is inserted into the float and inserted into or lashed to the boom, or (d) the aft boom is lashed directly to the float. It is always risky to suggest an evolutionary series, but it looks as if an inserted direct attachment, here usually under the modified form of the *sedek*, might have been the earliest form for both booms. The greatest strain in an outrigger is at its fore end, and a lashed attachment might have been adopted to counteract this, while the assumed primitive form would be retained for the aft boom; it will be noted that a lashing is provided for the *sedek* for greater security. The rod attachment is probably a modification of the *sedek*. It would only require that the rod should be lashed to both the boom and the float to convert



it into a simple form of Halmaheran attachment. The lashing would give at the same time greater strength and elasticity and probably less liability to fracture.

The colonization of Java from India, according to Havell, was probably a sequence of the final collapse of the Sâka power in India at the beginning of the fifth century, when the kingdom of Sarâshtra or Kathiâwâr, which had been ruled for centuries by the Sâka dynasty, of foreign origin, was conquered by Chandra-gupta II (Vikramâditya) between A.D. 388 and 401. This great monarch, although tolerant of Buddhism and Jainism, was himself an orthodox Hindu (V. A. Smith, p. 292). "After that Brahmanism supplanted Buddhism as the principal State religion of India, the Buddhist art traditions went with the Sâka immigrants to Java, where they reached their highest expression in the magnificent sculptures of Borobudur" (Havell, p. 113).

"It having been foretold," say the [Javanese] chronicles, 'to a king of Kûj'rat, or Gujerat, that his kingdom would decay and go to ruin altogether, the Prince resolved to send his son to Java . . . and embarked him with about five thousand followers for that island. Among these followers were people skilled in agriculture, artificers, men learned in medicine, able writers, and military men. They sailed in six large ships and upwards of a hundred small.' [This was in A.D. 603. Later on a reinforcement was sent of two thousand people.] 'From this period,' continue the chronicles, 'Java was known and celebrated as a kingdom; an extensive commerce was carried on with Gujerat and other countries. . . . During the sovereignty of the Prince and his two immediate successors, the country advanced in fame and prosperity . . . artists especially in stone and metals arrived from distant countries' and temples were constructed . . . 'and at Borobudur in Kedu during these periods by artists from India.' . . . The building of the splendid shrine of Borobudur, the most magnificent monument of Buddhist art in the whole of Asia, is ascribed to *circa* A.D. 750 to 800, but the decoration of it must have spread over several centuries. It was not in fact entirely completed before the Buddhist faith in Java was superseded by orthodox Brahmanism as the State religion, about the tenth century" (Havell, pp. 111, 112). C. Leemans, however, states that, according to the annals of Java, Brawidjaja of Kalinga founded the Empire of Mendang Kamoulân in Java. This prince arrived in the year 525 of Sâka (A.D. 603). What transferred the religion of Hindustan to Java was not war, these were not conquests, it was commerce and navigation (p. 541). The fall of the Empire of Borobudur took place towards the end of the tenth century (p. 537).

Assuming that there was a large organized expedition from India to Java in A.D. 603, it presupposes a knowledge of the island and of its suitability for colonization, and for an undetermined time previously there must have been voyages to and fro. At all events, we can date the sculptures of the ships at latest within the eighth and tenth centuries and the types of the ships may have been common much earlier. These carvings are of especial value in the present connection as they are the earliest



records of outriggers, of which several varieties were fitted to these ocean-faring plank-built ships.

Representations of seven ships are given in Leemans' atlas of "*Bôrô-Boedoer*" (some of which have been copied by Radhakumud Mookerji), two of which are without outriggers, one having a simple mast and the other a tripod one. The other five ships have outriggers which we may suppose were double, as four show a port outrigger, and one a starboard outrigger. Four have two masts, the other (26) has a single one; one (24) clearly has a double or bipedal mast, and in others it is possible that there may be bipedal or tripod masts, but the details are obscure. In two a single series of rungs project from the single or both masts, and also in the aft mast of another (27), but in this ship the foremast has two rungs. In one ship (28) the rungs appear to abut against rope, it is possible they may have been connected with it.

Three ships have three straight outrigger-booms, another (27) has four booms, while the three booms of the fifth (28) do not appear to be straight. All these booms pass below or over a gunwale board. In two ships (26, 27) the straight booms pass

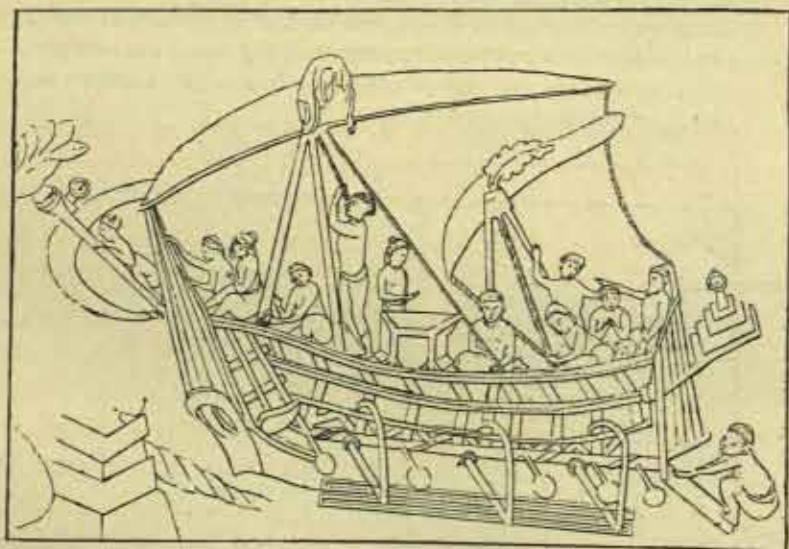


FIG. 24.—INDO-JAVANESE SHIP: TWO BIPED MASTS, THREE STRAIGHT BOOMS WHICH PASS BETWEEN THE TWO LONGITUDINAL SPARS AND OVER THE DOUBLE FLOAT, THREE CURVED BOOMS WHICH PASS OVER THE TWO LONGITUDINAL SPARS AND OVER THE DOUBLE FLOAT (LEEMANS, pl. ciii, 176).

below the single longitudinal spar, in two (24, 25) they pass between the two longitudinal spars. In two ships (25, 27) the ends of these booms lie well above the float, in one (26) they appear to pass behind the inner element of the double float, and in a fourth (24) they appear to pass in front of both elements.

In four ships, in association with the straight booms are an equal number of downwardly curved booms, which usually pass over the gunwale board and under





FIG. 25.—INDO-JAVANESE SHIP: TWO MASTS, THREE STRAIGHT BOOMS WHICH PASS BETWEEN THE TWO LONGITUDINAL SPARS, THREE CURVED BOOMS WHICH APPEAR TO PASS BETWEEN THE LONGITUDINAL SPARS, THEY PASS BETWEEN THE TWO ELEMENTS OF THE DOUBLE FLOAT AND CURL UP TOWARDS THE UPPER ASPECT OF THE OUTER ELEMENT OF THE FLOAT (LEEMANS, pl. ci, 172).



FIG. 26.—INDO-JAVANESE SHIP: ONE MAST WITH RUNGS, THREE STRAIGHT BOOMS WHICH PASS BELOW THE LONGITUDINAL SPAR AND APPARENTLY BELOW THE DOUBLE FLOAT, TWO FALSE BOOMS, THREE CURVED BOOMS WHICH PASS OVER THE LONGITUDINAL SPAR AND BETWEEN THE TWO ELEMENTS OF THE FLOAT (LEEMANS, pl. ccli, 41).



FIG. 27.—INDO-JAVANESE SHIP: TWO MASTS WITH RUNGS, FOUR STRAIGHT BOOMS WHICH PASS BELOW THE LONGITUDINAL SPAR, FOUR CURVED BOOMS WHICH PASS OVER THE LONGITUDINAL SPAR AND BETWEEN THE TWO ELEMENTS OF THE DOUBLE FLOAT AND PROJECT BEYOND THE OUTER OF THESE (LEEMANS, pl. cxxiii, 216).



FIG. 28.—INDO-JAVANESE SHIP: TWO MASTS WITH RUNGS, THREE BOOMS WHICH ARE PROBABLY SLIGHTLY CURVED, THEIR ENDS ARE PRESUMABLY LASHED TO THE DOUBLE FLOAT (LEEMANS, pl. lxxviii, 106).

another board or rail. When one longitudinal spar is present (26, 27) they curve over (in front of) it, or if there are two longitudinal spars they curve over both in one and doubtfully over the inner and behind the outer (i.e., they pass between them) in the other. In two cases (25, 27) the curved booms pass between the two elements of the double float and curl under and more or less to the front of the outer element ;



in another (26) they simply pass between the two elements of the float; in the fourth (24) they pass in front of both elements.

In the fifth ship (28) the longitudinal spar is absent and the ends of the slightly curved three booms pass to the outer side of the double float, the two elements of which are shown as being tied together—I regard these three booms as the equivalents of the curved booms, the straight booms being absent.

In one (26) of the two ships with a single internal longitudinal spar, this spar is further supported by two false booms to which it is tied, and a central lashing passes between this spar and the float, embracing both elements of the latter. These contrivances frequently persist in Indonesian canoes.

It is very difficult to arrive at a satisfactory conclusion as to the construction of these vessels and to the real nature and structure of the outrigger. One gets the impression that the sculptors did not really understand the details of the working drawings, which evidently were supplied to them. Probably they were artists who had no practical knowledge of sea-craft; further, there were technical difficulties to be overcome in representing so complex an object as a two-masted sailing ship with its gear in relatively low relief, and it is amazing they did it so well.

It is evident that the straight booms, curved booms, and longitudinal spars must have been lashed together, and the ends of the curved booms to the float, but these usually are not indicated.

The straight booms in two ships resemble the booms of existing boats with a Halmaheran attachment, in two others they appear to reach the double float, but whether they were actually lashed to it is uncertain. The most problematical of these is Fig. 24, here the curved booms apparently meet the straight booms on the float; it bears a superficial resemblance to Rosenberg's model of a sailing canoe from the Mentawai Islands (Fig. 1), the double float of which is apparently lashed to one boom coming out horizontally from the gunwale of the canoe and to another slanting down from the roof of the cabin; it is possible that this slanting boom or "boom spar" may correspond with the curved boom of the carving; the model lacks the longitudinal spars which I regard as being present in the Indo-Javan vessel.

What is the nature of the curved booms? At first sight they appear to be fairly typical Halmaheran attachments, but, on the other hand, in three cases they seem to come out of the side of the vessel, but this is not so markedly the case in the fourth case (Fig. 24). If they come out of the vessel they may be regarded as true outrigger-booms, somewhat analogous to the central booms of the Sulu canoes, or as the curved booms of Pritchett's "pirate craft" (Fig. 8), but if this be so the straight booms have to be accounted for. If the curved booms are the essential booms, then the straight ones may have been intended simply to strengthen the outrigger. We must remember that these craft were ocean-going sailing vessels, and consequently the outrigger had to be very strong.

Owing to the kindness of L. W. Jenkins, of the Peabody Museum, Salem, Mass.,



I am able to illustrate (Fig. 29) a canoe model from Nonuti (Nanouti) Island, Gilbert Group, which has a single outrigger of three curved booms, which are attached to the float in the same manner as that of the Funafuti canoe (Fig. 33). There are in addition two straight booms which are lashed on to the short longitudinal spar.

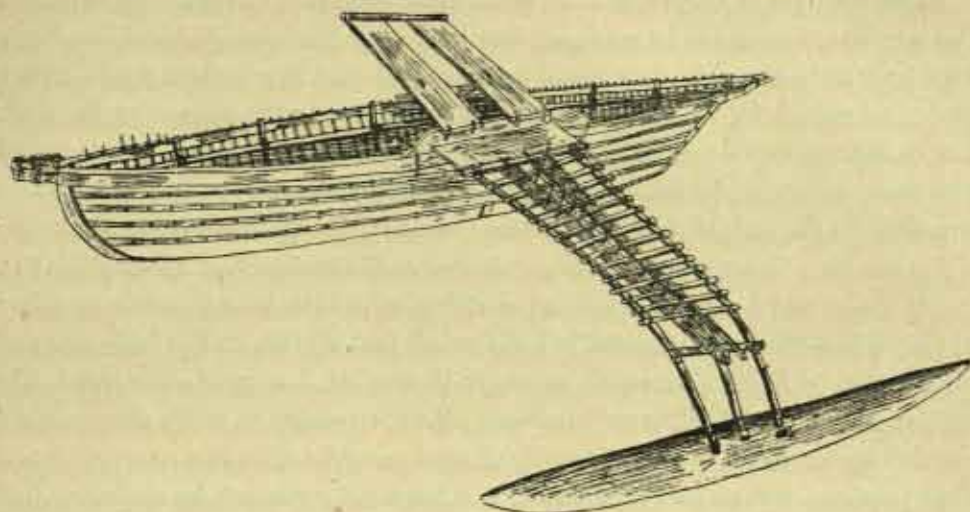


FIG. 29.—SKETCH FROM A PHOTOGRAPH OF A MODEL OF A CANOE WITH THREE CURVED BOOMS WITH A DIRECT LASHED ATTACHMENT AND TWO STRAIGHT BOOMS, NONUTI (NANOUTI) GILBERT GROUP (SALEM).

The other spars on the curved booms form a platform. There is also a "weather platform." This model supports the suggestion that the straight booms of the Indo-Javanese craft merely supported the curved booms, which appear to have been the essential ones. In the Marshall Group (pp. 81, 126) the two straight booms are supported by inserted sticks.

I have already suggested how a Halmaheran attachment might arise from an inserted rod-attachment (p. 99). Granting a pre-existing Halmaheran attachment, when the size of the vessel was increased, its upper part of the attachment may have been prolonged so as to enable it to be secured firmly to the hull of the vessel, as appears to be the case in some of these carvings. One other alternative presents itself: it is possible that the Halmaheran attachment may be derived from a curved outrigger-boom. With the increase in the size of the vessel and the assumed addition of a straight boom to strengthen the outrigger we get the apparently typical Indo-Javanese arrangement. If lighter vessels were built the straight boom might persist and only the curved terminal portion of the curved boom be retained; it would then become the means of connecting the straight boom with the float.

Whence did these sea-faring vessels which bore Indian immigrants to Java obtain their outriggers? At the present time the South Indian outrigger is composed solely of two booms with a direct tied attachment. The earliest evidence on this



point I have been able to discover is the drawing given by Lintscotus (II Pars, XCIX, Pl. XIV, D 3) of a boat from Goa and Cochin with a single outrigger of two booms which rest on the gunwales and on the flat upper surface of the large float. The method of fastening is not clear; it may be by means of stapler, but more probably by sinnet lashings, in which case those of the float would pass through undercut holes. This negative evidence is by no means conclusive. If the bent booms of the Javan ships be true booms then they might be compared with the modern South Indian outriggers, except for their number and the curled lower ends supporting the float. The number presents no difficulty as the larger size of the Javan vessels would necessitate this. So far as I am aware, the arrangement by which the float is supported by the ends of the curved booms is unique, though the three central booms of a model from Gowa, South Celebes, are lashed to the underside of the float (p. 84).

If the curved booms be an enlarged Halmaheran attachment, it follows either (1) that this method was invented in India, or (2) that it originated in Indonesia and was adopted by Hindus for vessels sailing in this region. As previously noted, the great expedition of A.D. 603 surely indicates that the country to which they voyaged was well known to the leaders, probably through centuries of trading intercourse, and if the outrigger was already established in Indonesia it would not be surprising that the local Hindus adopted so practical a device to render their large craft more seaworthy. An additional argument for Indonesian origin is supplied by the presence of the longitudinal spar, which was sometimes connected with the float by a lashing.

In 1596, according to L. (I, p. 35), the Javan craft consisted of two-masted merchant ships, *Ionco*; war vessels: small, with or without a sail, *parao*, and large sailing *cathar*; and small fishing canoes with a double outrigger and direct, probably tied, attachment, while they carried a large sail which gave them marvellous speed.

#### *The Lesser Sunda Islands.*

I have been able to gather but very little information as regards these islands. Bali has already been dealt with. Hornell states (p. 99) that a Halmaheran attachment is common in Lombok, the only instance I know of recorded from the whole group, but Professor S. J. Hickson has given me a photograph of Coupang, Timor, in which it occurs. A direct lashed attachment occurs in Sumba and Lombok, and the Moluccan at Wetta. At Baba (Babber) there are the direct lashed, Halmaheran? and, judging from an indistinct photograph by Pflüger (p. 146), something that looks like an inserted stick attachment; I cannot make out the details, but if it be so, it is, so far as I know, a unique record for this part of Indonesia, unless the vertical spar of Riedel's model from Tenimber is inserted into as well as lashed to the float, but a true Halmaheran attachment does occur there (Fig. 4).

#### *The Kei and Aru Islands.*

A direct lashed attachment has been seen in a fresh water creek at Totoat, Kei Islands, and a Moluccan at Batu merah, in the south-east. A typical Halmaheran



attachment occurs at Dobbo (Pulo Wamar), Aru Islands. Doubtless the great development of plank-built boats in this region has had an inhibiting effect on outrigger craft, as has occurred in North-west Indonesia.

From an ethnological point of view the Kei Islands were originally Papuan, as they still are racially to some extent, but they have been so influenced by cultures coming in from the Archipelago that they may now appropriately be considered as essentially Indonesian. The Kei Islanders are noted throughout the Archipelago for their skill in shipbuilding.

Wallace gives a description of the construction of boats by the Kei Islanders and states that they are the best boat-builders in Indonesia (II, pp. 183-186, see also pp. 92, 159). Langen also gives an account of their boat-building and says that they supply boats to the natives of the Aru and Banda Islands (p. 43).

Van Hoëvell thinks that the dialects of the Aru Islands appear to be closely akin to *bahasa tanah*. Friederici does not find it so, as they, and the dialects of the Kei Islands, have little to do with those dialects, like *bahasa tanah*, which have a direct culture—historical connection with Melanesia. But, on the other hand, language, ethnography, and mythology show that the natives of the Aru and Kei Islands have a great common substratum with the Alfurs of the Moluccas and Minahassa. An important element in the Kei Islands was formed by fugitives from Banda, as to a certain extent is proved by the characteristics and language of the folk at Eli, Ellat and Fehr in Great Kei (Fr., III, p. 9). The little western island of Dobbo has an annual market which is frequented by traders from all parts; it forms an economic link between New Guinea and Indonesia. The natives are undoubtedly Papuans, but settlements from Indonesia have modified some of the coastal groups.

#### *The Moluccas.*<sup>1</sup>

There are, in the main, three types of craft in Banda and Amboina: (1) the plank boats, (2) the outrigger canoe, and (3) the dug-out.

(1) The beautiful large plank boats, *ōrēmbai*, have a stem-post, which, as seen from the side, is broader and lower than the stern-post. The *orembai* of Amboina and Banda have been modified by European influence, but in general reveal the Indonesian original type, this latter persists among the fishing population and in form and construction resembles the *mon* of Buka in the Solomon Islands. Friederici gives further details of their construction which do not concern us here.

(2) Outrigger-canoes consist of a dug-out with moderately pointed, almost similar stem- and stern-posts, sometimes with additions. In Banda the sides are often heightened by planks, but in Amboina with a bamboo gunwale. Some Banda canoes have the high beak of the *orembai*. All have two floats at the end of two booms athwart the hull, the float and boom are attached by pieces of ratan of the thickness of the thumb and lashed with spliced liana or thin ratan. The Moluccan attachment

<sup>1</sup> The following account is largely taken from Friederici, II, pp. 235-243, and III, pp. 159-162.



is described on p. 89. The floats at Banda consist of bamboo, at Amboina of one or two lengths of *gabbagabba* (the mid-rib of the leaf of the sago palm), side by side. Both kinds are bent up in front like sledge-runners. The aft boom is usually quite near to the aft end of the float, the fore boom is further from its fore end. The booms, which are of light wood, are laid over the edge of the hull, sometimes for strength they are lashed with arenga-string to a pole placed beneath them and between the sides of the canoe. These poles and the booms are tied with lashing of ratan or arenga to ledges projecting from the keel and side planks through the eyes in which the lashing is passed; there is no special name in the Moluccas for these holed ledges, so Friederici adopts the Melanesian term of *patnat* for them. Sometimes Y-shaped wooden forks are lashed to the booms to carry fish-spears, paddles, and other gear. Originally, and still among the primitive fishers of Banda and Ambon, all the parts are sewn and tied together. The commonest names for outrigger-canoe in Banda, Amboina and the neighbourhood are *prāu* (*prahū*) and *hūkā*, but in the country-speech of Amboina and the Uliassers are also found *tala*, *talalo*, *talo*, *alal*, *sapu* and *sapou*.

(3) In Banda and Amboina there are also very rude, in part trough-like, dug-outs called *kōlōkōle*, which are also called *prāu* when a clumsy double outrigger is added. *Kōlōkōle* is the same word as *kōrāk rā* (p. 117).

The Moluccan *korra-korra* is a vessel of the same construction as a large *orembai*, but with a double outrigger. The first and best description and illustrations of these was given by Forrest (pp. 23, 67, 83, pls. 4, 5, 10, 12, 15). These craft are especially known in the history of the Moluccas and of Western New Guinea as the constituent part of the notorious Hongi fleets.

In Banda and Amboina a tripod-mast, with a quadrangular sail set obliquely, is in general use. The baler is the concave portion of a large sea-shell, or made of the sheath of a palm-leaf which has the form of the common Polynesian baler. Friederici (II, p. 238) states that the technical nautical terms collected by him at Banda are nearly all Malay or Malayized. Corresponding terms in the language of the old inhabitants of Banda perhaps survive in a single village in the Kei Islands inhabited by descendants of the Banda folk. The Amboina terms are also much Malayized. The old true Alfuran terms occur only in the remote and slightly affected villages of Amboina and the neighbouring islands.

Martin describes an *orembai* seen by him in Piru Bay, West Ceram (1894, p. 86), and refers to three kinds of craft at Buru: the *sarua* is used in Kajeli Bay in the east (p. 258); the *fakatora* is the boat of the Galelaese who live with the Sulanese in different kampongs on the south coast west of Tifu (p. 356), he describes the rig and method of sailing (p. 358); the *prau* as seen on Lake Wakollo, Buru, is unusual, the double outrigger consists of three slightly curved booms, instead of the customary two, with a direct tied attachment (p. 329).

A direct lashed attachment occurs on Lake Wakollo in Buru.



The U-Moluccan attachment occurs here and there on Buru ; as the predominant or exclusive form of attachment on Banda, Amboina and the Uliassers ; on Ceram, with the exceptions of most places on the north coast ; Obi. Friederici speaks of it as sporadically diffused throughout the Northern Moluccas and as being found wherever the *bahasa tanah* is spoken (III, p. 161). On Amboina the attachment is almost always the O-type, while at Banda the 6-type predominates. At Amboina the float usually consists of one or usually two lengths of *gabbagabba* (midrib of sago palm-leaf).

The simple Moluccan attachment is confined to Indonesia, but a crossed double variety occurs sporadically in the West Pacific (p. 129), which Friederici believes was carried thither by his Alfuren migration.

Some form of Halmaheran attachment is known from Banda, Buru, on Amboina, the north coast of Ceram, Misol, and at Obi it is more in evidence than the Moluccan attachment. Four booms may occur at Misol (G., No. 267) ; I do not know whether this is generally the case, but the type of outrigger is precisely like that characteristic of the north-west area of New Guinea. Guillemard (1894, p. 427) states that the fauna is Papuan and that the inhabitants of the interior are true Papuans, but on the coast are a mixed Malayo-Papuan race.

Following Friederici, we may adopt the term *Alfur* as the historical name for the aborigines, or at all events for early inhabitants of the Moluccas. He enters into a lengthy discussion (III, pp. 1-4) of the modern abuses of that word, a term which merely indicates the ruder inland hill-people as contrasted with the more advanced coast-dwellers, a distinction met with all over Eastern Indonesia, New Guinea, and the larger islands of the South Seas. He also points out that, "these Alfurs of the Moluccas and North-east Celebes are not somatically uniform and their languages belong rather to a linguistic family. Ethnologically they form a fairly uniform layer of an older evolutionary or colonization period than the layer of the coast people ; and also historically they form a positive unity, as in a large measure they appear to have contributed to the Melanesian population of New Guinea and the islands further east" (III, p. 3). He adds : "The Alfurs of Ceram, Ambon, the Uliassers, and Buru, only persisting now in the interior of Ceram and Buru, are physically distinct from the Malay and Malayized population of Mongoloid affinity now occupying the greatest part of the East Indian Archipelago and the Philippines. They are darker than the latter, taller, more powerful, with fine yet strong limbs and joints, and without the flat noses of the Malays, Tagals and others" (III, p. 150). Martin says, "I have no doubt that the highlanders of Buru and Seran [Ceram] are closer to Melanesians than to Malaysians" (1894, *cf.* pp. 79, 119, 288). Some still live on the coasts in various places as von Rosenberg has found in Ceram (1878, II, p. 26), though the majority as their name implies are "bushmen."

In Buru and Amblau the population has undergone a considerable mixture since the arrival of the Europeans. The coast population of Buru, especially at the Kajeli end, is strongly mixed. Amblau has received immigrants from Nusa Laut and



Western Ceram. Everywhere here the trade language is Molucca-Malay, or at least it is understood, but the Alfurs of the interior have largely preserved their speech (Fr., III, p. 9).

Friederici (III, p. 7) states that the so-called Ambonese language, *bahasa tanah*, is split into very numerous dialects on different islands. The Alfurs of Ceram comprise the Patasiwa in the west and the Patalima in the east. This condition formerly obtained in the Uliassers and in Amboina.<sup>1</sup> Language and tradition show that the Alfurs of Western Ceram and the original inhabitants of Amboina and the Uliassers were one tribe, and till the arrival of the Portuguese formed an ethnological and somatological whole, with only dialectic differences. The dialect of Eastern Ceram reaches also to Goram, thus the *bahasa tanah* of Amboina, the Uliassers, and of Western Ceram, is manifestly somewhat more remote. Of the dialects of Western Ceram that of the old Huamual (Little Ceram) appears to have been the mother-tongue of several others, including that of Amboina; it was the classical, a kind of sacred language (as is the *kawi*, or Ancient Javanese, among the Javanese). At the time when the Dutch first arrived, Huamual was one great garden, "a Paradise on earth," with 11,000 inhabitants and 2,000 warriors, now it is an awful wilderness in which no human beings live (Riedel, pp. 92, 93; Fr., III, p. 8). Fugitives from Banda have mixed with the inhabitants of Eastern Ceram, Ceram Laut, and Goram.

No trace remains of the original inhabitants of the Obi (Ombi) Islands (Fr., III, p. 9).

#### *Halmahera and Neighbouring Islands.*

A direct lashed attachment occurs at Batjan, Ternate, and on Lake Galela in North Halmahera.

The U-Moluccan attachment predominates at Batjan, with a few cases of the Halmaheran attachment; the float is almost always of bamboo as in Banda, sometimes a second is tied beside the first. At Ternate the U-Moluccan attachment greatly predominates (Fr., II, p. 239).

The Halmaheran attachment occurs at Tidore.

In 1599 (Nicolas, II., Pls. 14, 15, 17) there were at Ternate two-masted merchant ships with an outrigger of three booms and a Y-board attachment; war-vessels, *carcolle*, a double outrigger, the largest had a fighting-platform, three booms with the usual Y-board attachment and longitudinal planks for paddlers, though others had two booms usually with Y-boards, over which was a longitudinal plank for paddlers, or a direct (? tied) attachment, in which case the paddlers sat on the float; a "gondola," *cymbe*, with outrigger, two booms and direct attachment; fishing canoes with outrigger, two booms and direct attachment. As I have previously stated, too much reliance should not be placed on these early engravings, but I think it is safe to assume that the outrigger was double in all vessels; we know it was in some,

<sup>1</sup> For further information on this dual division and for a suggestion as to its origin, see W. J. Perry, p. 46.



and probably in all, of the *carcolle* type. Presumably the direct attachment was tied. None of the old books I have consulted indicate a Moluccan attachment, but it would not be safe to base any definite argument on this negative evidence; Weule (Pl. 112, Fig. 7) figures a "Boot von den Molukken" with a double outrigger of three booms, beneath the middle of which is a longitudinal board for paddlers; there is a Moluccan attachment, but he does not give his authority, nor the date of the craft.

Friederici noted that the Halmaheran attachment greatly predominated in the north of Halmahera at Tobelo and Galela, though occasionally the U-Moluccan attachment occurs. In Halmahera the small ledges on the inner side of the hull of the canoe are not eyed, but cross-bars are placed beneath them athwart the hull, and the booms are lashed to the cross-bars by arenga or by coconut-fibre string. The two lateral feet of the triangle-mast have their bases perforated, through these holes is passed a transverse rod which itself passes through and is supported by two short stanchions which are lashed to a cross-bar; but in Tobelo and Galela the stems of spikes bent at a right angle are fastened to cross-bars, and the inwardly projecting spike is inserted into the hole in the feet of the two masts. Forrest (pp. 9, 18) was the first to draw attention to the merits of the very practical tripod mast. The upper ends of three bamboo poles of this very light mast are fastened close together hinge-wise in such a way that only one pole projects beyond the others, and to this is attached the mast rope. Below, the middle foot is the longest and it can be tilted at any angle as occasion demands (Fr., II, p. 240). A short central wash-strake is added to some outrigger canoes, with two notches on its free border in which the booms rest. The floats at Tobelo, Galela, and Kau are fashioned out of bamboo poles slightly bent up in front, or of thin wooden rods shaped like the runners of a sledge. The forks on which the mast, sail, and other gear are laid may be made of a natural branch, a carved piece of wood, or of a branched stick inserted into the hollow of a piece of bamboo; these are strongly lashed to the booms. Paddles, as everywhere else in the Moluccas, have a crutch grip. Balers at Halmahera and Ternate consist of a bucket-shaped little basket made out of a Licuala leaf or are cut out of a piece of bamboo. Wooden anchors weighted with stones are used universally in Tobelo and Galela, as iron has not come into use there (*loc. cit.*, p. 241). As a matter of fact, similar anchors are widely employed in Indonesia.

In Weda Bay, Patani, and Buli, canoes have two booms with a Halmaheran attachment, but in some a false-boom is added; in this case the inner longitudinal spar (which lies beneath the knee-bend of the attachments) merely extends from one outrigger boom to the other, whereas the outer longitudinal spar projects much further beyond the booms, and its ends are bound tightly with arenga or ratan lashing to the ends of the float, while a third lashing passes from the crossing of the false-boom and outer longitudinal spar to the middle of the float. In Weda Bay and Patani the floats are usually of bamboo, bent upwards rather high, in Buli the sledge-runner type is prevalent. Friederici did not notice the forked mast and gear holders



in Weda Bay and Patani, which, however, occur at Buli. Neither did he see a plank (or wash-strake) added to the hull, as in the north of Halmahera, but, sporadically, the edges of the dug-outs were heightened amidships by the addition of strips of *gabbagabba*. The attap cabin in the middle of the craft had closed sides, these are left open further east. The tripod-mast is present. The triton-shell trumpet is used. A simple, often rough, dug-out without outriggers occurs (*loc. cit.*, p. 242).

A shorter, more obtuse form of Halmaheran attachment is found at Ake-Selakā (Fig. 16 C), and here and there the U-Moluccan attachment. The floats are mostly of the sledge-runner type, but the bamboo form with a slightly upward curve in front also occurs. When mast and gear forks occur, they are mostly crescentic. The rectangular sail, as usual, is set obliquely. Everything else is as in other places in Halmahera (*loc. cit.*, p. 243).

Friederici points out that the peoples of Halmahera and neighbouring islands form a separate linguistic group, remote from the Malayo-Polynesian languages and apparently unconnected with any hitherto known Papuan languages. Ethnologically the Alfurs of Halmahera form a great group with the Alfurs of the Moluccas and those of North-east Celebes, and in the main probably anthropologically as well. He could not see that the natives of Tidore, Ternate, and Halmahera differed appreciably in appearance from other Indonesians, and in none of the places that he visited did he note features or skin-colour approaching those of the so-called "Aryan race" (III, pp. 9, 10).

"There are at least five dialects among the Alfurs of Minahassa. The more westerly and southern languages of Celebes (those of Gorontalo, Baree, and the Togian Islands) are further removed from Melanesian languages. The dialects of the Alfurs of Minahassa and of the Sangir and Talaut Islands belong to the great group of Philippine languages, which, according to Kern, reach to Formosa. But the *bahasa tanah* and the dialects of Minahassa have a common linguistic substratum, so that originally the Alfurs of Ceram and its neighbourhood were akin to those of Minahassa" (Fr., III, pp. 10, 11).

#### *Celebes and Neighbouring Islands.*

The aboriginal inhabitants of the Sula Islands belong ethnologically to Middle Celebes; the coastal folk are a very mixed crowd (Fr., III, p. 9). There is a Halmaheran attachment.

Friederici saw three kinds of craft in Buton: (1) a boat without outrigger, (2) boats with a double outrigger with two kinds of attachment (*a*) with usually three booms, the U-Moluccan attachment and three bamboos bound together to form the float, (*b*) an attachment which recalls the Halmaheran (Fig. 16, A). In Makassar he saw no outrigger boats, *lepālepā*, but according to models in the museum at Weltevreden double outriggers occur. In Bugi also the *lepālepā* is found (Matthes, *Boegi*, p. 544, quoted by Fr., II, p. 235).



In Celebes a direct lashed attachment has been recorded at Makassar and Gowa, a model from the latter place with five booms and a mixed direct attachment is referred to on pp. 80, 84, 106, 114; it is found on the Malili River (at the north-east of the Gulf of Boni, on Matanna Lake, further inland, at Paloppo (on the west side of the head of the Gulf of Boni and at Libukang in the same gulf, where the Sarasins illustrate one canoe with a float composed of four bamboos; it also recurs at Kema in the extreme north-east of the island. The Halmaheran attachment, however, in various forms, predominates throughout Celebes. According to the illustrations of D'Urville (II, pl. XXV, 3) and Pflüger (pp. 100, 103) the canoes on Lake Tondano, Minahassa, are simple dug-outs with square boarded ends. The "praus in roadstead of Makassar" figured by Pflüger (p. 71) have a triangle mast, the yard may be lowered to the boom or the boom raised to the yard. The Celeban canoes almost invariably have two outrigger booms, the model from Gowa just mentioned being very exceptional and probably represents a Sulu craft and not a local one. The outlayers of sailing boats in the Gulf of Boni are referred to on p. 76.

The region embracing Minahassa, Banka, the Talaut (including Sangir), and Tular groups is characterised by the occurrence of a mixed direct lashed and Halmaheran attachment: this may, for short, be termed the "north-eastern Celeban area." The examples known to me are described on pp. 95, 96. Müller, as we have seen (p. 98), draws attention to the affinities of the mixed attachment in this area with that of the "eastern Javanese area"; in both the fore boom is lashed directly to the float, but in the Javan area the indirect attachment of the aft boom is inserted into the float, whereas in the Celeban area it is lashed to it, being a typical Halmaheran attachment. There is, however, at Kema in Minahassa a mixed rod and Halmaheran attachment in which the fore boom has a rod attachment which apparently is inserted into the float, while the aft boom has a typical Halmaheran attachment (Fig. 23). There was much going to and fro in Indonesia in former times, so no surprise need be felt if these two regions, separated by the whole length of the large island of Celebes, show some resemblances, but these are not close in detail.

A direct lashed attachment occurs at Sangir and a mixed lashed direct and straight vertical Halmaheran attachment. More than two booms are present. Miniature *sakit* canoes from Nanusa Island (to the north-east of Celebes) have two or three booms which are simply pegged on to the float; the mode of attachment has no significance, as these are merely ceremonial models; some *sakit* canoes are without outriggers, they are employed in the exorcism of the *sakit* or spirit of sickness (pp. 77, 96, and Hickson, 1893, Fig., p. 290).

#### *Sulu Archipelago.*

In the Sulu archipelago small canoes may have but two booms and the outrigger may be placed at the aft end of the canoe (Guillemard, 1889, p. 206; G., Nos. 180, 217). Usually there are three or four booms (p. 80). In these canoes the fore and aft booms are always straight, whereas the central booms are downwardly curved at



their ends (Fig. 7), but in Wilkes' figure (V, p. 333) all three booms are downwardly curved—this is probably incorrect. In all cases there is a direct lashed attachment. Two or more upwardly curved bars are generally fastened transversely across the canoe, usually they are attached to the booms (when they may be called "boom-spars," they are the "Bügel" of Müller) and frequently they bear, near each end of the boom, a crutch or forked stick to support gear; in the canoe figured by Wilkes each of the three booms supports a semicircular spar with forked ends, the arms of which in the sectional view (V, p. 332) are shown as connected with the boom by a lashing.

An analogous combination of straight and partially curved booms is found in the Madura district, where the straight booms are tied to, and the curved ones inserted into, the float (p. 84). In a model from South Celebes, the fore and aft straight booms are inserted into the float, while the middle three are lashed to it (p. 113). It is possible that the latter may throw some light on the somewhat perplexing difference in form of the Sulu booms, and one is tempted to suggest that the outer straight Sulu booms were originally inserted into the float, but this would be the exact opposite to the arrangement at Madura.

Probably belonging to this region is the "pirate craft" of Pritchett, which has three strongly curved outrigger-booms on each side, the forked ends of which are lashed to the floats (pp. 81, 84). Guillemard states that the southern part of Sulu Island "is inhabited chiefly by the Bajaus or sea-gipsies, a people quite distinct from the Sulus, and of a much lower type" (1894, II, p. 90).

#### *Philippines.*

Müller (p. 244) says that the canoes of Sulu, Zamboanga, and Cebu are in the main similar. The floats are not attached to the "Bügel" (Fig. 2, A—C) but are attached directly to the booms [by a lashed attachment], which are not more than two in number and are unusually thin and fragile, and need strengthening by the elasticity of the concave "Bügel" ["boom-spars"] which are half the length of the booms. Vojnich figures three booms at Manila and on Lake Lanao in Mindanao (pp. 378, 383).

Mr. Henry Balfour has very kindly made drawings for me (Figs. 30, 31) of one of two similar models of canoes used on the Pasig River, Manila; the specimens were collected by the late Admiral Maclear and presented by Mrs. Maclear to the Pitt-Rivers Museum, Oxford. They are fitted with a double outrigger which, however, is provided with but one boom which is lashed to the float, the other end of the float is lashed to a thwart which projects slightly beyond the sides of the hull, an arrangement which, so far as I am aware, is unique. The models are furnished with an awning.

The outlayers of Philippine boats have been noted on p. 76, and the remark made by Folkard raises the question as to whether the structures of the Oxford models may not really be outlayers.

Judging from an illustration given by A. H. Savage Landor, a canoe with a double outrigger, two booms, and a direct lashed attachment occurs in the Cagayan Group, Mindoro Sea (I, p. 228).



The most widely spread, important, and best known languages of the southern Philippines is that of the so-called "pirate tribes" of Mindanao and Sulu. It is a dialect or form of Bisaya with a strong infiltration of Malayan elements, and is spoken by the Moros of Mindanao, Basilan, in the Sulu and Tawi-Tawi Archipelagoes, Palawan, Balabec, and in North Borneo (Fr., III, p. 11).

*Borneo.*

As outrigger canoes are such a feature in Indonesia, their almost total absence from Borneo is rather surprising, but this absence, as in the western and northern

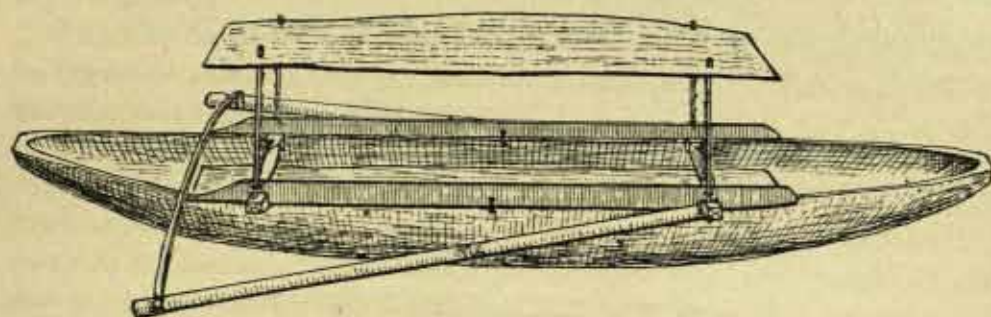


FIG. 30.—MODEL OF A CANOE WITH A DOUBLE OUTRIGGER AND ONE BOOM, PASIG RIVER, MANILA  
(SKETCH BY H. BALFOUR, OXFORD).

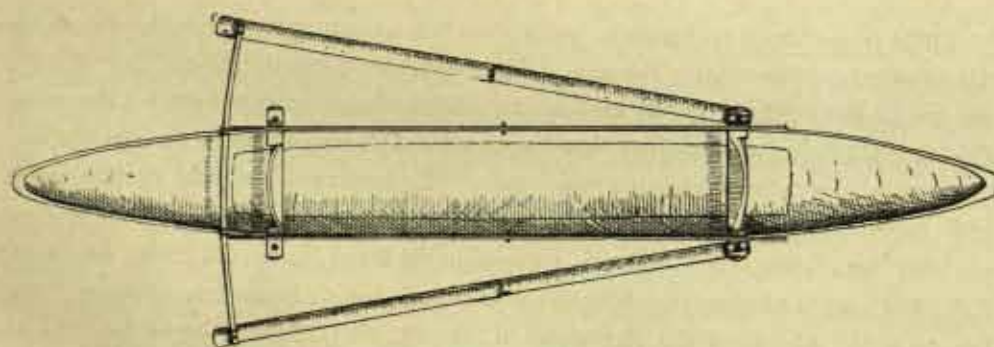


FIG. 31.—SAME AS FIG. 30 SEEN FROM ABOVE AND WITHOUT THE AWNING  
(SKETCH BY H. BALFOUR, OXFORD).

portions of both Sumatra and Java, seems to be due to secondary causes. Hose and McDougall give an illustration (copied from Ling Roth, I, p. 144) of a rough model made of pith of a small canoe with two outriggers, the booms of which pass through the solid hull and are inserted laterally into the floats. The model, which is in the Leiden Museum, came from South-east Borneo, a district far removed from the Malanan country. Apparently a similar imitation canoe, *jong*, is employed by the Malanau in the *bayoh* ceremony for the casting out of diseases (II, Fig. 84, p. 133).



They state that the Malanau are Klemantans, a mixed group of Bornean peoples, of the coast regions of Sarawak, most of whom have recently become converted to Islam, while all of them have been much influenced by Malays (II, p. 129). A. E. Lawrence, of Sarawak, kindly gave me two sketches (Fig. 32), drawn from memory, of toy "schooners," *jong*, sailed by Malanau and Malay children along the Sarawak coast, both have a single outrigger, one with two straight booms, while the other has only a single boom; in both cases the booms are inserted into holes in the side of the float, *pēlempong*. I am also indebted to Ivor H. Evans, of Perak, for informing me that when travelling in the Tempassuk District of British North Borneo, some Bajaus temporarily fitted a small low dug-out, *gobang*, for him with a double outrigger of two straight booms which were lashed to bamboo floats. This was the only occasion

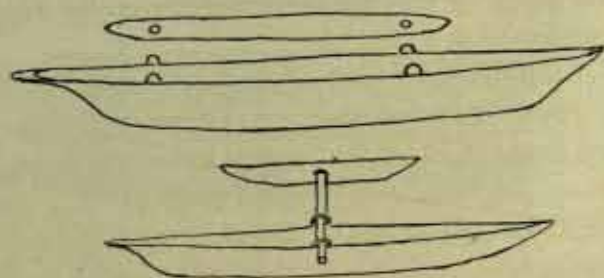


FIG. 32.—TOY CANOES, *jong*, OF MALANAU AND MALAY CHILDREN, SARAWAK  
(FROM SKETCHES BY A. E. LAWRENCE).

on which he had seen an outrigger in Borneo, but he had not very much to do with the villages near the coast. He adds, "The Bajaus were great pirates in the old days and might have picked up the idea in any of the islands further east." The word *gobang* is the Sulu *guban* (*infra*), thus the canoe and its name may be an importation, or may be indigenous to the area as a whole. The outlayers described by Beeckman have been noted on p. 76. For a description of the usual type of craft in Borneo see Ling Roth (II, pp. 246-254), and for ceremonial boats (I, pp. 144, 283); he states, "It would seem at one time Sumatra was supplied with boats from Borneo" (II, *f.n.*, p. 249); also Hose and McDougall (I, pp. 55, 56, 132, 166), Gomes (pp. 49-51) and Nieuwenhuis.

#### NOTES ON THE NATIVE NAMES FOR CANOES AND OUTRIGGERS.

The following terms for outrigger canoes are given by Friederici, the names for boats without outriggers are placed within ( ). Terms of outrigger canoes added by me are placed within [ ].

Andamans [*châ-rigma*]. Nicobars [*due*, *daē* and *doai*]. Mentawai [*abak*]. Engano [*eloha*]. Sumatra [*jellore*, *ballelang*]. Bali, *dyukān*, *sāmpān* in Malay. Confined to a restricted area of the Lesser Sunda Islands, we find in Sumba, *tena*, *teneh*; Middle and Eastern Flores: Sikka, *tena*, and Maumeri, *tenah*; Solor, *tenna*.



Flores, *korakora*. The most customary names for an outrigger canoe in Banda, Amboina and the Uliassers are *prau* (*prahū*) and *hākā*; but also *tala*, *talalo*, *talo*, *alal*, *sapu* and *sapou* are to be found in the country speech of Ambon and the Uliassers (II, 237). Sumbawa, *lopie* or *lopi*. Banda, *korakora*, *prau* (*kolekole*, but called *prau* when outrigger added; *orembai*). Amboina, *prau*, *prahū semān*, *prahu belan*, *hākā*, *kolekole*, *korakora*, *lepa* or *prahū lepalepa*, *tala*, *talalo*, *alal*, *sapu* (*orembai*). Batjan, *nyōn*. Ternate, *oti* or *ōti*. Halmahera: *korakora*; Weda Bay and Patani, *yēl*; Buli, *pēlān*; Tobelo, *ngotōrī*, *ōtuli* or *otil*, (here the *lepālepā* is a dug-out without outrigger); Galela, *deru*; Ake Selaka, *oti*. Celebes, *lepālepā*, *korakora*; Salaier, *lopi*. Sulu, *guban*.

The following notes are taken mainly from Friederici (II, pp. 244–246), who gives full references. He also gives the variants of these terms that occur in Melanesia, but these do not concern us here.

The *dyukān* of Bali does not occur in any form eastwards of the Philippines. It is the Malay *djokong*; Javanese *djukung*, *djungkung*; [Nicobar, *duē*]; Batjan, *nyōn*; in the Philippines: Tontemboan, *rungku*, Bisaya and Bicol, *adyong*; Iloko, *daon*; Tagal, *dawong*; [Borneo, *jong*]; *Diadōkū* or *diadūkū* is the name for the outrigger-booms at Tobelo (Halmahera). Also cf. *ionco* (p. 106).

*Kōlēkōle* is clearly the same word as *kōrākōrā*, which term is current in Makassar, throughout the Moluccas, in Halmahera and Western New Guinea, and it also extends to Flores. It is more than doubtful, says Friederici (III, p. 159), whether the word *korakora* of the Moluccas really goes back to the Arabic *qorqōr* and thence to the Portuguese *carraca*. Valentijn, who treats the word as an indigenous one, is certainly wrong when he derives it from the Malay *kura-kura*. In the oldest Portuguese and Spanish accounts of the Moluccas we find *caracora*, *coracora*, *carcoa*, but never *carraca*; de Morga not only says expressly that it is an ancient and indigenous word among the Tagals of Mindoro, Marinduque, and Luzon, but that it is also a true Malayo-Polynesian word: in the Malay Peninsula, *kolek* (a small fishing boat); Amboina, *kolekole*; Mota (Banks Islands) *kora*; San Cristoval (South Solomons), *ora*. Friederici asserts that this equation is not merely accidental as there is other support for it, and he has shown that most of the boat-names of Eastern Indonesia recur in Melanesia. He adds (III, p. 159) that the Moluccan *korakora* corresponds to the Philippine *barangay*. [The Achinese have a sailing boat called "*kolay*" (Folkard, p. 481)].

The Malay *prahu*, *perahu*, *p.rahu*, *prau*, etc., is a general term for canoe, boat, or ship and appears to be used indiscriminately in places for craft with or without an outrigger, and therefore has no special significance, thus in Amboina an outrigger canoe may be termed *prahū semān*.

The *hākā* of Amboina is the Malayo-Polynesian *wangka*, which is so widely spread in the South Seas as to be universal. In Saonek and Sorong, *wāŕ*, and Manukwari (Doreh) *wa* or *wai*: all in New Guinea. [Ray points out that the term *laka*,



used in Madagascar for the canoe with a double outrigger, "is no doubt the Melanesian *waka*, etc., also that Malagasy and Tagal are more closely related than either of them is to the language of the islands between" (Haddon, 1918, p. 53). Christian (p. 229) gives: Malay *wangkang*, a junk; Moluccas, *waga*, a vessel; Philippine Islands, *banka*, a canoe; Waigiu, *wang*, a pirate craft. Keane points out that the Mentawai *abak* is the *va'a* or *vaka* of Polynesia (1899, *f.n.*, p. 244; 1920 *f.n.*, p. 235).]

Another interesting word from the point of view of migrations to the Western Pacific is the *lepalepa* of the Bugi [originally a people of the Boni district of Celebes], it is also employed at Makassar; variants are: Malay Peninsula, *lopek*, *lupek*, *lopek*; at Bima and Sangar in Sumbawa, *lopie* or *lopi*; Salaier Islands, *lopi*; Amboina, *lepa*, *prahu lepalepa*; Tobelo (Halmahera), *lepölepa*, for a dug-out without an outrigger (Fr., II, p. 241); Philippines, *lapis*, *lapes*.

In Ambon and the Uliassers are *alal*, *tala*, *talo*, *talal*, *talalo*; it is possible that the word *yel*, which is apparently confined to Weda Bay (Halmahera), belongs here.

In Halmahera and the neighbouring islands we find: *öti* or *öti*, Ternate, Roni, Ake-Selaka; *öti*, Tidor Isam, Tololiku, Waioli; *ngöötüli*, Madole, Tabaru; *nötüli*, Ibu; *ngötüri*, *ötüli* and *ötü* Tobelo.

Apparently restricted to Galela and Loda is the word *deru*.

Obviously connected with *pēlan* of Buli in Halmahera are: *bero*, Solor; *belo*, *berok*, *prahu berok*, Timor; *bero*, Wetta and Tenimber; *prahū belān* or *belang*, Amboina; *beri-beri* Namatote Island, north-west of Triton Bay, New Guinea; in the Philippines: *balanay*, Tagal; *baranay*, Iloko. Kern equates the *velo-velo* of Fiji [which belongs to this series] with *Biduq*, Malay and *biluq* Tagal (Fr., II, p. 245).

Friederici also groups together *loju*, Sulla Islands; *lotu*, Gesir, south-east point of Ceram; *lete'ie*, *lettej*, Aru Islands.

With the term *guban* of the Sulu Islands may be equated *konea*, Sava (between Sumba and Timor); *ofa*, *ofak*, Rotti (south of Timor); *gobun*, Bongu. Later Friederici (III, p. 160, *f.n.*, 280) adds that the *guban* of the Sulu Islands occurs as *goba* in Malay, and it appears to him that the Dayak *top*, a small ship, is also a related word; [among the Bajau of British North Borneo we find *gobang*, p. 116].

The beautiful, large plank-boats without outriggers of Ambon and Banda come from the Kei Islands, but their name of *örēmbāi* or *örēmbai*, also *örānbāi* or *örānbai*, does not come thence but is probably of Malay origin, *rēmbaja*; other variants in the country-speech of Amboina are: *arobail*, *arubai*, *arubaillo*, *arumbai*, and as *arumbae* in Gesir (Fr., II, pp. 235, 236). An *orembai* with outriggers is called *korakora*, a word which is found as *kolekole*, *kolek* in Malayo-Polynesian languages (Fr., III, p. 159). Martin (p. 86) says that the name *orembai* is a contraction for *orang baik* "good friend" (or "servant") and comes from the era of the Hongi voyages!

The number of the terms for booms given by Friederici is insufficient to enable us to arrive at any conclusions. The Moluccan term seems to be the *ūramōn* or *ōramōn* of Banda, which becomes *bairānān* in Batjan and *brayānān* in Bali. Several terms



are employed in Halmahera, one of which the *nādyu-nādyu* of Ake Selaka extends as might be expected to Ternate and reaches Amboina, where *nadyūn* also occurs. Concerning the terms *ēri*, *āri* of Buli and *sesā* of Galela (both in Halmahera) there is nothing to say, but as Friederici points out, the *diādōkū* of Tobelo seems to be the origin of the word *kiato*, which is so widely distributed in Melanesia and Polynesia for an outrigger boom. [The Nicobar name is *deia due*.]

Friederici gives the following names for outrigger attachments: Bali, *sēdēk*; Banda, *ūngerū*; Amboina, *pāgupāgu*; Batjan, *tudātudā*; Ternate, *pagu*; Halmahera: Buli, *tētē*, Tobelo, *tāntene*, Ake Selaka, *sēkē*. [The number of names available is so limited as to be inconclusive. The *sedek* of Bali may be connected with the *seke* of Ake Selaka, and Ternate and Amboina are again linked together. The Nicobar term is *heneme*.]

As Friederici points out (II, pp. 246, 235-243), the term *sāmān*, or some variant of it for the float of an outrigger, is so widespread among the Malayo-Polynesian peoples that the investigator should note whenever it does not occur; it is its variants that need comparison. Thus we have: Banda and Ambon, *semān*; Batjan, *somān*; Ternate, *samā*; Halmahera: Weda Bay (and Patani) *zomān*, *somān*; Tobelo, *hamānā*; Galela, *sumā*; Roni, Ake Selaka, *samā* and *semāsemā* in Malay; also variants as in Sangir, *sahēmang*.

He thinks, contrary to Kern, that the general term for outrigger-float is derived from the old Javanese *sama*, "like," Bali, *sama samasama*; also Sumba, *sama* means "at the same time, together, with, at the same time like," etc. For the float is in reality a miniature boat, a small counterpart of a boat, indeed it has been stated, from an ethnological point of view, that the outrigger boat has been derived from the double-boat. So also have we in Malay: *sama*, "resembling, similar"; *sama-sama*, "together," and in Tagal, *sama*, "companion, to accompany" and "companion like the servant"; *samaco*, "a fitted-up boat" and "to prepare or embellish, to construct la banca (the Philippine canoe)."

The only other terms Friederici notes for float are the *bārā* of Buli, concerning which he has nothing to say, and the *kāter* or *kātir* of Bali, which is quite obviously: Tara (Bareë) *katigi*; Bisaya, *katig*; Lake Magindanao, Mindanao, *katik*; and Bikol, *katig*. This appears very significant when we recall the correspondence between certain craft of Bali and those of the area between the Philippines and North Celebes. [The Nicobar name is *hentaha*.]

#### GENERAL CONCLUSIONS.

It may be taken as a general principle in distributions, whether of animals or men, that the more primitive, that is to say less advanced, types are generally to be found on the margins of an area or in the less accessible or undesirable localities within the area. If the area be an archipelago like Indonesia we should therefore expect to find more primitive conditions on its outskirts or in the interior



of the larger islands, and many travellers tell us that as a rule the latter is indeed the case.

As a knowledge of the ethnography of Indonesia is necessary for a study of that of Oceania, so the converse is equally true. Cultures have been so crowded into Indonesia at various times, and so many internal movements have taken place, that a disentangling of the chronological sequence of the cultures is a very difficult undertaking. A valuable attempt of this kind has been made by Perry (1918), which, however, has little bearing on the present problem. It is recognised that migrations of variable extent take place everywhere, each always associated with definite and characteristic cultural elements. We know that similar migrations from Indonesia have taken place at intervals to various regions of the Pacific which transported samples of the then stages of culture. It is from a consideration of such samples in these Oceanic areas and a co-ordination of the linked cultural elements they contain, that the relative age of ethnographical data in Indonesia will ultimately be elucidated. From different points of view Graebner, Friederici, and Rivers have done great service in this direction. Graebner (1905, 1909) was, I believe, the first to utilise the general type of canoe, as well as the presence or absence of outriggers and most obvious features of their attachments, as evidence for the differentiation of various cultures and culture-strata in Oceania, but the details he gives are very meagre. Friederici (II, 1908) has presented a mass of technological and linguistic evidence concerning canoes, which is of the greatest importance for the study of these problems, and later (III, 1913) has attempted to map out certain cultural streams from Indonesia into the Pacific. Finally, Rivers (1914) has utilised similar evidence in his dissection of the cultural strata in Melanesia.

All movements between different islands in Indonesia and those thence to Oceania must have been accomplished by boats of some description or other, and eventually we may hope to discover what kinds of boats they employed, the types of outriggers and varieties of attachments. My main object in this paper is to prepare the way for more extended historical studies on these lines.

The problems of the distribution and history of canoes in Oceania are beyond the scope of this paper; for this purpose it will be necessary to make a more thorough analysis of the types of canoes and outriggers throughout the Pacific, there being many varieties which have to be accounted for, and, furthermore, a definite terminology will have to be generally adopted. But for my immediate purpose I find it necessary to make a few remarks upon certain distributions of canoes in Oceania.

A very brief summary of the probable racial history of the area will perhaps not be out of place. There seems sufficient evidence to assume that much later than the original occupation of a part or the whole of Indonesia by Negritos, Papuans, and the less early Pre-Dravidians, were the migrations from somewhere in Southern Asia of the dolichocephalic Indonesians. Possibly some of them were, at all events in their later migrations, already somewhat admixed with southern Mongoloids.



Somewhat later perhaps came swarms of brachycephalic southern Mongoloids, who may conveniently be termed Proto-Malays, some of whom may have been crossed previously with other stocks. On the whole they have dominated the true Indonesian peoples; but the bulk of the population of the archipelago consists of various blends of these two stocks. The Malay Peninsula was first occupied in the twelfth century A.D. by the true Malays, Orang Malayu, who crossed over from Menangkabau in Sumatra; thence at the close of the thirteenth century they spread over the East Indian archipelago. But long previously to this other peoples had secured a foothold in Java and elsewhere. From the first century of our era there were migrations from India. The Javanese Babads tell of an Indian prince who came to Java about A.D. 78 or 120, where he found a nomadic people. We know of Indian colonies in Bali, Sumatra and Java in the third century (Fritsch, pp. 14, 21). I have already referred to a later colonisation (p. 100).

Chinese infiltration may not have begun after 220 B.C., when South China was conquered from the aboriginal population and a seaboard acquired, but commercial relations existed with Java and other islands in the fifth century A.D., and were continued for a long period, perhaps they have never ceased. The Chinese Buddhist missionary Fa-Hien, or Hsien, visited Java from India in the fifth century A.D.

Arabian traders voyaged to the East Indian archipelago long before the time of Muhammad, but Islam changed the Arab trader into a teacher of the new doctrine.

At the beginning of the sixteenth century the Portuguese made settlements, and were followed later by other European peoples (Haddon, 1911, p. 35).

Two hypotheses are current concerning the origin of the outrigger: (1) That it is derived from a double canoe, one of the canoes having degenerated into the float of the outrigger. In double canoes one of them often is smaller than the other and in some places the smaller canoe bears the same name as the float, as for example at Mailu, in British New Guinea, where the term *larima* is used for the smaller element of a double canoe, *orōū*, and for the float of a single canoe, *vaona*. (2) That the canoe was evolved from the central log of a float or raft, the two outermost logs of which have persisted as the floats of a double outrigger, an evolution which took place solely in Indonesia. If the first hypothesis be correct, it would follow that the single outrigger was the primitive type, but the second hypothesis would make the double outrigger the original form. But if we assume a dug-out to be the initial boat, and it is or has been used in practically every part of the world (rafts, bark canoes, and skin boats are another story), there does not seem to be any reason why either form of outrigger should be the earlier, though in this case there is no structure from which an outrigger could be naturally developed.

The question of the priority of the single or double outrigger is of some importance. So far as historical data go, the earliest record we have is that of the Indo-Javanese double outrigger ships of twelve centuries ago. Apart from the East African area, to which I have already alluded (p. 78), double outriggers outside of



Indonesia are found with a rare and scattered distribution in Oceania. They occur in the area which includes Torres Straits and the estuary of the Fly River, but single outriggers also now occur there, both being associated with an overcrossed stick attachment (p. 85). They are also to be found in North Queensland, (a) the Batavia River type with an attachment of two vertical sticks, from Batavia River in the Gulf of Carpentaria, round Cape York to about Cape Grenville (lat.  $12^{\circ}$  S.); (b) the Claremont type with a direct lashed attachment, apparently from Cape Direction (lat.  $13^{\circ}$  S.) to Claremont Point (lat.  $14^{\circ}$  S.) (Haddon, 1913). They have been reported in Oceania, formerly in the Pelew Islands, and doubtfully in the Seniavina Group of the Carolines; they occur at Nissan with a direct lashed attachment, temporarily in the Solomons with three booms lashed to a float consisting of a bundle of bamboos, doubtfully at Samoa, and formerly at the Marquesas, and also formerly at Easter Island with a direct lashed attachment (Haddon, 1913, p. 621). A scattered marginal distribution of this kind suggests antiquity, and provisionally we may accept this supposition. Although the Torres Straits area is not geographically remote from Indonesia, I am strongly of opinion that it is culturally remote and that the double outrigger came there by the West Pacific route.

In Torres Straits and the estuary of the Fly we have definite evidence that the single outrigger is ousting the double, and it seems probable that this has occurred elsewhere, though there is very little precise information on the subject. Müller (1912, p. 245) alludes to a change of double outrigger into a single as having occurred in the Pelew Islands. In a letter to me dated July 14, 1913, Friederici says: "I have now no doubt that the *köp* [the Nissan double outrigger canoe with a direct tied attachment] has been brought by a Philippine or sub-Philippine wandering stream to New Ireland and neighbourhood, and that the double outrigger has in course of time been displaced by the Melanesian single outrigger and has stood its ground only in the island of Nissan." Apparently both forms occurred at Easter Island (p. 124).

The double outrigger is more stable but clumsier than the single, the latter has better sailing qualities, but great care has to be exercised in the management of the float in order to maintain the balance of the boat.

The single outrigger is a marginal phenomenon. Within Indonesia it occurs very rarely and sporadically (p. 78). It is normal in the Andamans and Nicobars and reappears in Geelvink Bay, it is practically universal in New Guinea and Oceania.

Very frequently associated with a single outrigger is the presence of several booms as in the Andamans, Geelvink Bay, the Massim, West Papuo-Melanesian, and Gulf districts of British New Guinea, and most parts of Melanesia, but to a much less extent in Polynesia. On the other hand, we have seen (p. 80) that the Philippine area, including the Sulu Islands, Sangir Islands (occasionally), in Misol, Waigiu and other neighbouring islands, and Geelvink Bay numerous booms are associated with a



double outrigger. Thus so far as Indonesia is concerned several booms to a single outrigger is a marginal characteristic, and so is, but to a less extent, the association of several booms with double outriggers, as this is practically confined to the eastern margin of Indonesia. We must not, however, overlook the occasional occurrence of three booms within the central area of Indonesia (p. 80). At present I leave it an open question whether these are relics of a more general distribution, as I suspect them to be, or as borrowings from the eastern margin.

Indonesia, excluding its eastern margin, is therefore characterised by canoes having double outriggers with two booms.

The diffusion of canoes with double outriggers and two booms from Indonesia into Oceania must have taken place in very early times and possibly on two occasions, one with a direct tied attachment (p. 124) and the other with an inserted stick attachment. At present I am not in a position to suggest which is the older type; but if the float be derived from the smaller element of a double canoe an indirect attachment would not become necessary until the float had been reduced to a log or a piece of bamboo. On the hypothesis of the evolution of the outrigger canoe from a raft, the tied attachment would be the more primitive, as the need of an indirect attachment would not arise until the central plank of the raft had become converted into a canoe. On the other hand, a stick attachment appears to be characteristic of various types of primitive outrigger canoes.

I now pass to a consideration of the distribution of the main types of attachments.

#### A.—*Direct.*

1. *Inserted.*—With the exception of the somewhat aberrant Balinese attachment I have not come across an unequivocal case in Indonesia of an actual canoe where all the booms are so attached.

The direct inserted attachment has a less extended range than the lashed. The only Melanesian record is from Eromanga in the New Hebrides (Hedley, p. 287). Krämer found at Tutuila in the Samoan group that the straight booms have a downwardly slanting branch the end of which is inserted into the float (1903, II, p. 249; 1906, Fig. 42, p. 415; 1911, p. 23a). I have been told it occurs at Rotuma; Friederici also records it for Mangaia and Rimatara, while in the more northerly Cook Islands of Atiu and Mitiaro the end of the booms is curved downwardly to be inserted in the float (Fr., II, p. 314, Figs. 127–130). The direct inserted attachment also occurs in the Paumotu (Pallander, p. 194, figures a canoe with two booms, the fore with a crooked inserted boom, the aft with a stick attachment). It thus appears to be most prevalent in the Southern Polynesian area.

I feel some slight hesitation in accepting all these records, as the Tutuila attachment is very like that which occurs at Funafuti, which, though it looks as if it should belong to this class, is really a lashed attachment, and we know there have been close relations between the Samoans and Ellice Islanders.



2. *Lashed*.—This type is very widely but sparsely distributed throughout Indonesia, so much so that little can be deduced therefrom, unless it signifies that it is really an ancient form. It is interesting to note that it crops up in various lakes and rivers, where its appearance may mean that it is an old type, or simply that in these calmer waters it suffices for the needs of the fisher folk. But it is also significant that this type is very prevalent in the Sulu Islands and in the southern and central Philippines, i.e., in the eastern margin of our area.

The direct lashed attachment (with a single outrigger) alone occurs in south India and Ceylon, whence it may have spread into Indonesia, or may equally well have traversed in the reverse direction.

It very rarely crops up in Western Oceania, where it is associated with a double outrigger; e.g., the *kōp* of Nissan in the North Solomons (Krause (Fig. 101); Friederici, cf. Haddon 1913, Fig. 14) and North-east Queensland from 13°–14° S. lat. (Claremont type, *loc. cit.*, Fig. 7, after Roth). It occurs with a single outrigger at Nonuti in the Gilberts (Fig. 29) and universally in the Hawaiian Islands, and in the Marquesas (model, Salem Museum; ? Pallander, Pl., p. 240); at Easter Island with a double outrigger (Choris, Pl. X, Fig. 1, cf. Haddon, 1913, p. 621); but in the "Atlas du Voyage de la Pérouse" (London, 1798, pl. 61), a single outrigger of two booms is shown, the float rests upon and is tied to the booms; ? Napuka (Wytoo-kee), Paumotus (Wilkes, I, p. 319, but the sketch is not convincing); Tahiti (Wilkes, II, p. 21; Edge-Partington, *Ethnol. Album*, I, Pl. 29); and Huaheine, the easternmost of the Leeward Group of the Society Islands (Ellis, II, 1831, p. 352). At Funafuti in the Ellice Islands (Fig. 33) there are three straight booms

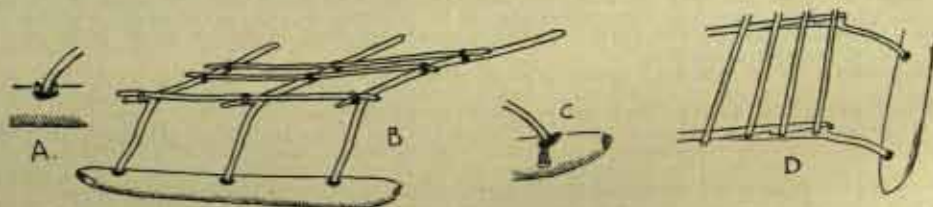


FIG. 33.—ATTACHMENTS OF CANOES, FUNAFUTI, ELLICE ISLANDS (AFTER HEDLEY).

which have a long oblique branch near the end, the tip of this branch rests on the float to which it is lashed, sometimes it is lashed to short pegs on both sides of the boom (Hedley, p. 286, Pl. XV, Figs. 1, 6, 7; Alexander, p. 796, pl. 35); in a model in the Cambridge Museum there is only one peg; the pegs are inserted into the float. De Clercq and Schmeltz describe (p. 94) and figure (Pl. XXIV, Fig. 5) a canoe from Ansum, New Guinea, with a direct lashed attachment, but as all the accounts we have from Geelvink Bay speak solely of a "spike" attachment we may suspect that the model is inaccurate. In 1914 I saw at Buniki, a short distance



up the Dabara arumo, a small river on the east side of the Bebea River (the northerly mouth of the Bamu) in the Western Division of British New Guinea, a solitary example of a canoe with a single outrigger of two booms with a direct tied attachment—it may have been an individual occurrence of no special significance, as the canoe was a very small one—another canoe had the stick attachment characteristic of that district.

*A mixed direct inserted and stick attachment.*—In all the boats seen by Friederici at Tahiti and the North and South Tuamotus (Paumotus) the aft boom had a direct inserted attachment, but the fore boom had sticks (Fr., II, p. 314, Figs. 131, 132); Pallander (Pl., p. 194) figures a canoe at Anaa, Paumotus, in which the angular (? fore) boom is inserted into the float and the straight (? aft) boom is supported by two pairs of undercrossed sticks.

### B.—*Indirect Attachment.*

#### (a) *Attachment Inserted into the Float.*

1. *Stick.*—The only places in Indonesia where this occurs are the Andamans and Nicobars, *i.e.*, marginal within the area; here the sticks vary in number and arrangement, they may be vertical, oblique or if in pairs overcrossed or undercrossed.

In a copy of an old engraving (Mager, p. 137) two double booms, one above the other (boom and boom spar), are attached to the float by two sticks on the same side of both booms in a canoe of the Mariana or Ladrone Islands; Anson gives a most excellent account and engraving (reproduced by Ling Roth, p. 123, Pl., p. 118, and sketched by Folkard, Fig. p. 463) of "a flying proa taken at the Ladrone Islands," it has three booms (the central one may or may not be a false boom) with the same attachment, there are two longitudinal spars and two oblique stay spars; and Safford (Pl. XI, p. 493) gives a figure of a Guam canoe with two booms each with one pair of undercrossed sticks and apparently a vertical lashing between them.

Kubary figures (Pls. LIII, Fig. 20; LIV, Figs. 3, 5) a *paopao* canoe from Nukuor and a *war* canoe from Ponape in the Carolines with a similar attachment of two oblique sticks, the latter has two stay spars, to each of which, where it becomes free from the hull, is fastened a curved spar, *apic*, which apparently is inserted into the float between the normal attachment and its ends; a similar spar on each side of the two straight booms occurred on a model from Kusaie in the Salem Museum (but one of these *apic* has entirely disappeared, while the other is represented only by its distal end which is inserted into the float; how they were fastened to the hull is not shown in the photograph), but the booms have a Y-stick attachment (these are thus a mixed direct inserted and stick-, and direct inserted and Y-stick-attachments); another Kusaie model (Salem Museum) has two pairs of undercrossed sticks for each boom and a curved spar which is lashed to the boom and comes downwards and forwards beneath



the crossings of the sticks; at Wolea are two vertical sticks on the outer side of each boom, or two sticks on each side, a "bracing spar" slants up from the sticks to the boom (Macmillan Brown, Pl. F, and photograph; Mayer, p. 129). The typical Marshall Islands canoe has two straight booms with one stick (model Salem Museum), two sticks, one on each side (Krämer 1906, p. 416, Fig. 6) or two on each side (model Amsterdam Museum); in the two former three curved booms which arise from the hull on either side of the booms and are lashed to the float (i.e., a mixed direct lashed and stick attachment) see pp. 81, 105, Kubary (Pl. LIV, Fig. 7) indicates a similar arrangement. Folkard (p. 499), as usual, copied Wilkes' drawing (V., p. 49) of a canoe from Drummond I. (Tapiteuea), Gilbert or Kingsmill Islands, with three converging booms and one oblique stick on each side of each boom; a model in the Cambridge Museum from this group has three vertical sticks, and another model has one pair of undercrossed sticks to each of the three booms.

A simple stick attachment characterizes the *tsine* canoe of Nissan, an island between New Ireland and Bougainville (Fr., II, Figs. 95, 98; Haddon, 1913, Fig. 6) and the three northerly islands of the scattered chain to the east of the Solomons: Nuguria (Thilenius, 1902, p. 61, Pl. III, Fig. 2; Fr., II, Figs. 106-108), Tauu (Fr., II, Fig. 103), and Nukumanu (Fr., II, p. 300). There is intercourse between these islands and the Gilberts and between the latter and the Polynesian Islands to the south, so it is not surprising that a similar form of attachment is common to them all. Thus we meet with it in Rotuma, Union or Tokelau group, Samoan group, Friendly Islands (Tongan group), and Nieue. The furthest east that I know of it is from Nikuhiva (Marquesas), where d'Urville (I, Pl. LXI, Fig. 2) illustrates a double canoe with four curved booms and an attachment of four tall vertical sticks. In the Fiji group the sticks consist of two pairs of diverging overcrossed sticks; precisely this arrangement is typical of Torres Straits, where it is associated with a double outrigger, and a two-stick attachment occurs at Batavia River, North-west Queensland, which is remarkably like the Nissan *tsine*, except that there is a double outrigger.

There is considerable variation in the stick attachments of Northern and Southern Melanesia, which lack of space precludes me from describing. The most common type consists of undercrossed sticks. New Guinea is also characterized by various types of stick attachment; as I am preparing a memoir on this subject I need not further allude to it, except to say that the undercrossed type extends from the east of Geelvink Bay to the Massim District in the extreme south-east, whence probably came the Cape Bedford *wangga*, which extends along the north-east coast of Queensland from the Flinders Group in the south of Princess Charlotte Bay (lat. 14° S.) to Cape Grafton (lat. 17° S.) (Haddon, 1913, p. 617).

The stick attachment may certainly be regarded as an ancient type. Its presence in the Andamans, New Guinea, and Melanesia at first sight might suggest that it was primitively associated with the pygmy, or the taller Oceanic Negroids



who are usually termed Papuans. Among the Negritos only the Andamanese possess it, and the arrangement of their stick attachment points to a borrowing of the outrigger from the Nicobars. In New Guinea and Melanesia the evidence is strongly against it being part of the old Papuan culture. Very few true Papuan peoples possess an outrigger of any kind, and the names for canoes, and especially for the float, in New Guinea are in the great majority of cases of Austronesian origin. We know that during long periods of time many migrations have spread from Indonesia into New Guinea and the Western Pacific, the earlier of which gave rise to that mixed folk whom we term Melanesians, and several migrations of Melanesian peoples have passed into New Guinea carrying with them special types of canoes and outriggers and their distinctive names. The general prevalence of the stick attachment not only in New Guinea and Melanesia, but also in the South Polynesian area, supports the conclusion that its introduction into these regions is due to an early Indonesian influence. On the western border of Indonesia the stick attachment is associated with a single outrigger of several booms in the Andamans, as it is in Melanesia generally. Although the Andamanese are certainly among the most primitive of all existing peoples, there are indications that they have borrowed certain elements of a higher culture, of which the outrigger canoe is one. In the Nicobars the same type of stick attachment is associated with a single outrigger of two booms.

2. The *rod attachment* appears to be confined to Indonesia (p. 87).

3. The *spike attachment* is somewhat similar to the foregoing and is characteristic of and I believe peculiar to Geelvink Bay in New Guinea (p. 79); it consists of a thin stick or spike which is driven through the boom and into the float; usually a thin branch extends at right angles from the spike which is lashed on to the boom. Friederici (II, p. 251) says that this attachment is more easily taken to pieces than the Moluccan or Halmaheran, and that the natives hang up the hulls of the canoes in the corridor of the turtle-roofed houses. A spike attachment, combined with a bowed spar which passes along the top of the end of the boom to which it is lashed, the other end being lashed to the float, occurs at Nukutavaka, Paumotu Group (Alexander, pp. 766, 767).

4. The *Y-shaped stick attachment*, though not recorded for Indonesia, occurs widely in the West Pacific and is characteristic of Southern Micronesia, but it appears to be absent from the Mariana (Ladrone) and Marshall groups. In the Pelew Islands each boom may be supported in the fork of one or two of these sticks, it is prevalent in the Carolines and occurs in the Gilberts and at Nauru (Fig. 34). It is lashed to the side of a boom in Liueniua (Ontong Java) and Sikaiana on the eastern flank of the Solomons. In the Liueniua canoe recorded by Friederici the stem of the Y is immersed in the float and there is a lashing in addition, so that superficially it somewhat resembles the U-Moluccan attachment. A double overcrossed Y-stick occurs in the Loyalty Islands and New Caledonia. Its distribution, therefore, is W.-E., roughly between 10° N. lat. and the Equator, and roughly N.W.-S.E. from Liueniua



and Sikaiana to New Caledonia and the Loyalty Islands, but is unrecorded elsewhere (cf. Haddon, 1918, No. 68).

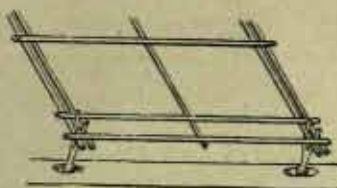


FIG. 34.—ATTACHMENT OF A CANOE, *ekuo*, NAURU, MICRONESIA, HORNIMAN MUSEUM (cf. HAMBRUCH, 1915, fig. 252).

5. The *board attachment* is typical of Indonesia; in this the boom passes through a board which is inserted into the float (p. 87). A precisely similar arrangement is found on the coast of East Africa, but with a stick or block of wood instead of a board (Haddon, 1918, No. 29). Here it is associated with a double outrigger of two booms. The East African outrigger canoe is universally recognised as having been derived from Indonesia, perhaps, as Hornell suggests, before indirect attachments were lashed to the float in the latter region. The inserted stick attachment is thus confined to marginal areas. A somewhat similar arrangement occurs at Wukuhiva, Marquesas Islands, Alexander (p. 745) figures a canoe with a single outrigger, each of the two booms of which passes through a board, the lower end of which is fastened to the float. According to his description, the ends of the booms "are seized to the perpendicular pieces, or stanchions, the length of which is, as a rule, the distance from the gunwale to the waterline. These pieces are seized to the top side of the float [and not inserted into it as in a true board attachment] . . . The crosspieces [booms], float, and stanchions are braced with withes." A curved brace is present.

6. The *Balinese attachment* is confined to the Eastern Javan area, but an interesting analogy to it occurs in Funafuti; Hedley says (p. 286) that the booms "are usually entire, but are sometimes made divisible, spliced in a lock-joint [scarfed] and served. The advantage of detaching the outrigger float from the hull occurs when the canoes are beached and rolled over, the separated hull being more manageable." The Balinese is really a direct inserted attachment, the Funafuti is a direct lashed one, but the occasional unshipping of the ends of the three booms which are permanently attached to the float is a new, and so far as I know, unique, feature. In the Santa Cruz Islands the whole outrigger apparatus may be detachable from the hull.

#### (b) *Attachment Tied to the Float.*

Lashed indirect attachments seem to have ousted the inserted stick attachments throughout the greater part of Indonesia, probably because lashing the attachment to, instead of simply inserting it into, the float was a more secure method of fastening, and at the same time supplied a certain amount of elasticity.



1. The *Halmaheran attachment* is confined to Indonesia and the north-west of New Guinea. It varies considerably in form and is widely spread within the area, perhaps because it is adaptable to vessels of large as well as of small size.

2. The *Moluccan attachment* has a restricted distribution within the area (in my paper in *Man*, 1918, I erroneously stated on pp. 117, 119 that it occurred in the Sulu archipelago).

3. The *double or crossed U-Moluccan attachment* occurs among the Barriai, Kobe, and Kilenge on the north coast of the western end of New Britain, at Witu (French Islands) north of New Britain, and among the Nakanai of the north coast of New Britain close to the Gazelle Peninsula, at San Cristoval in the Solomons, and in the Tongan Islands (Haddon, 1918, No. 68). I was misinformed that this attachment is now obsolete in the Tongan Group, as A. G. Mayer gives a photograph of it at Vavau (1916, p. 25).

With the exception of the last, which looks as if it indicated a definite and probably late cultural drift, it is significant that no indirect attachment tied to the float has been reported from Oceania, the inference being that this method developed in Indonesia after all the great migrations had taken place. (The introduction of the *mon* into the Solomon Islands is, however, of relatively recent date.) If the Indo-Javanese ships traded between Java and India we may assume that they also traded in Indonesia, and thus the knowledge of an effective tied attachment should have been known throughout the area. If these ships had a Halmaheran attachment we could assert that the great voyages from Indonesia to Oceania must have taken place long before A.D. 600, for if this attachment was suitable for ocean-going ships it would surely have been taken into the Pacific and have persisted somewhere there. The entire absence of double canoes from Indonesia and their occurrence in Oceania suggests that these craft belong to an old culture stratum and one which was contemporaneous with the inserted stick attachment, at all events these are at present associated together in Oceania and New Guinea. The Hawaiian type, with its single outrigger and direct lashed attachment, may belong to a special migration.

The persistence of the double outrigger in Indonesia requires some explanation, and it seems to be due to the fact that when provided with an outrigger the dug-out canoe is a very handy, light and stable craft, which is sufficient for the general purposes of an essentially fishing community.

For more extensive trading voyages boats built up of planks were constructed, probably under foreign influence, of the Moluccan *orembai* type. There can be no doubt that these at first retained the double outrigger, as the *korra-korra* still do; Friederici says this is a craft of the construction of a large *orembai*, but with outriggers (II, p. 237). In Indonesia it was found that the outrigger was unnecessary for large sailing craft and so it was discarded in the *orembai*. Perhaps the large *waga* of the Massim district of British New Guinea were derived from vessels of this type before the outrigger was discarded, but in the case of the *waga* the outrigger is single.



Friederici points out that the *mōn* (*mōna*, *mōrā*, *mōlā*, etc.) type of built-up canoe of the Solomon Islands, which is without an outrigger, is constructed in a similar manner to the *orembai*, indeed, Tasman compared the plank-built *mon* of South New Ireland to the "corre-corre" of Ternate (Fr., II, p. 238). The *mon* of the Solomon Islands have been developed on special lines, and it is open to discussion whether they were derived from an outriggerless plank boat or whether the outriggers were discarded in these islands. Friederici (III, p. 160) says that the *mon* is not a good sea-going craft (and he says the same is true of the *orembai*); it is true the Solomon Islanders make long voyages in them, but they are very careful to choose good weather. He is inclined to attribute its introduction to the second branch of his Alfuran migration and not to the Philippine migration (cf. *Man*, XVIII, 1918, p. 118). A criterion of the Philippine migration is the term *guban* (a Sulu archipelago name for a canoe with a double outrigger), but in the West Pacific the double outrigger is retained only in the *kop* (a variant of *guban*) of Nissan.

We have now to attempt to determine where the outrigger was invented.

As outrigger canoes are at the present time absent from the mainland of Asia,<sup>1</sup> except in the Southern Indian area, it is highly improbable that the Southern Mongoloids (Proto-Malays) brought this craft with them, though it is equally probable that earlier immigrants invented the outrigger after they had established themselves in the islands. I have already pointed out (p. 126) that it is very improbable that this invention was due to Negritos or Papuans, and I may here add to these the unprogressive Pre-Dravidians. This leaves us with the Indonesians and that early admixture of Indonesians with the first swarm of Proto-Malays to which the term *Alfur* has been applied (p. 109), and we may therefore confidently attribute the invention to them. Probably later immigrants adopted the outrigger, but the *Orang Malayu* always seem to have preferred the outrigger-less craft to which they were accustomed. Indeed it may very well be that this device was due to the inventiveness of the Indonesian, rather than to the Mongoloid, element in the *Alfurs*.

The early Arab navigators and others who may have come from the Red Sea or Persian Gulf were ignorant of this contrivance, as were also the Chinese navigators. Thus of all the voyagers to the East Indian archipelago, the only possible introducers of an outrigger were Indians, and it is doubtful whether they originally employed it.

In certain large areas of Indonesia outrigger canoes are extremely rare or even absent altogether. The main reason for this absence seems to be a knowledge of the art of building sea-going plank boats, an art which without doubt was introduced

<sup>1</sup> Mr. I. H. Evans, of Perak, informs me that his Malay assistant told him that a simple type of double outrigger is occasionally fitted temporarily to Malay boats, generally to the *prahu sagor*, a small dug-out, when heavily laden. This is the only record known to me, and it does not invalidate the generalization here made, as the idea may have been borrowed from the islands. Mr. Evans has "seen large tree trunks, whose wood was of greater specific gravity than water, lashed to the sides of *prahus*, something like outriggers, in bringing them by sea."



from without, and to which Arabs, Indians, and Chinese have contributed in varying degrees at different times; primitively this art appears to have come from Ancient Egypt. An analogous change has taken place in the Solomon Islands owing to a cultural drift from the Moluccas (Fr., II, p. 161).

An inspection of the map on p. 71 suggests that the present focus of outrigger canoes is in the Moluccas, and it is legitimate to suppose that from Indonesia, if not actually from the Moluccas, migrations took place at various times, each with its special type of canoe or with some partial modification. As a general rule one might expect to find that the earlier types of canoes or of outriggers were those that went furthest, and those that started last would have a more limited distribution; but we must also remember that the later swarms would be more civilised and have a better technical equipment, and thus some of them may have passed over earlier layers and have reached a far destination.

The general distribution of the main types is as follows:—

Marginal: Double outrigger with two booms and a stick or direct lashed attachment; but the double outrigger is also characteristic of the most central area.

Single outrigger with two booms and stick attachments: north coast of British New Guinea and South Polynesian area.

Single outrigger with several booms and stick attachments: Nicobars, Andamans, parts of New Guinea, Melanesia.

Single outrigger with two booms and a direct lashed attachment: South Indian area and North Polynesian area.

Within the area: Widely distributed, double outrigger with two booms and a direct lashed attachment.

Less distributed, double outrigger with two booms and a Halma-heran attachment.

Most restricted, double outrigger with two booms and a Moluccan attachment.

If we apply the principles enunciated at the beginning of this section we are led to conclude that the above order roughly represents an historical sequence in which it seems evident that, of the indirect attachments, the stick is the oldest and the Moluccan the most recent. There also appears to be a probability that the double outrigger is more ancient than the single, despite its persistence in Indonesia, a fact which does not fit in with the foregoing argument.

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- Friederici, G.—*Malayo-Polynesische Wanderungen*. Leipzig, 1914;  
 ——— *Verhandl. des XIX Deutschen Geographentages zu Strassburg i. Els.* 1914.  
 Berlin, 1915.

These reached me after my paper was in print; the earlier of these two papers is the more valuable as there are copious references. The author believes that the Malayo-Polynesian migrations left Indonesia before the Hindu influence there, and took place in the second and fourth centuries A.D., and that the Sumatran migration to Madagascar took place in the tenth century A.D. He suggests that the Malayo-Polynesian migrations were originally made on rafts of three beams, and that canoes with double outriggers were developed from them; the reduction of these to single outriggers “is quite a natural process”; the double canoe arose from the latter by the float being increased in size and hollowed out.

- Hornell, J.—“The Origins and Ethnological Significance of Indian Boat Designs.” *Mem. Asiatic Soc. of Bengal*, VII, p. 139, Calcutta, 1920.

This is a very valuable monograph. Hornell discusses the Javanese ships of the Borobudur sculptures and gives new drawings of my Figs. 25 and 28 which clear up certain points; both have biped masts, the latter having rungs between the limbs, and the three booms of this ship are distinctly curved and pass between the two elements of the float.

- “Les Pirogues à balancier de Madagascar et de l’Afrique orientale.” *La Géographie*, XXXIV. Paris, 1920, p. 1.

- “Madagascar and East Africa: Canoes.” *Man*, 1920, No. 67.

These excellent papers have appeared too late for me to refer to them, the former is the longer and has more illustrations. Hornell shows that the following varieties occur on the west coast of Madagascar, all with two booms:—

1. Direct inserted in a model of a sailing boat with an ordinary float on one side, and on the other the booms carry a reduced float which evidently serves as an outlayer.
2. Double outrigger with a small board (“peg stanchion”) attachments to the two floats.
3. Single outrigger with similar attachments, the booms on the other side being tied to a light bamboo spar to form an outlayer.
4. —do.—do.—, but only the fore boom is prolonged on the other side, it serves to extend the starboard sheet.

In the sixteenth and seventeenth centuries all the canoes appear to have had double outriggers, by the middle of the nineteenth century both forms occurred, now none but single ones occur.

The attachment in Madagascar is always vertical, as it is at Lamu, but in the other East African canoes it is oblique and the flat board is similarly horizontal or canted. Hornell rightly observes that these facts justify his previous conclusion that the outrigger canoes of Madagascar and East Africa are derived directly from Javanese [or at all events Indonesian] types. He points out that “In their consistently double form, the African varieties have retained a primitive structure almost entirely lost in present-day Madagascar outriggers” and that “the Lamu variety having vertical stanchions approaches most closely to the Madagascar form.”

I may add that I have just come across a very badly drawn illustration of a canoe from Mohelia, with a double outrigger; each pair of the two divergent booms appear to be directly connected with its float. T. H. [Herbert] Esquier, *A Relation of Some Yeares Travaille, Begunne Anno 1626*; London 1634.



# ON THE OCCURRENCE OF FLINT IMPLEMENTS OF MAN IN THE GLACIAL CHALKY BOULDER CLAY OF SUFFOLK.

[WITH PLATES I AND II.]

By J. REID MOIR.

THE object of this communication is to describe and figure accurately a series of humanly-fashioned flints which, during the past ten or twelve years, has been found in the glacial Chalky Boulder Clay of Suffolk. The uppermost beds of the plateau series in the neighbourhood of Ipswich, consist, in ascending order, of the Pliocene Red Crag, the Middle Glacial Gravel, and the Chalky Boulder Clay. The flint implements occurring in the detritus-bed beneath the Crag have already been described by Sir Ray Lankester, F.R.S., and by the author,<sup>1</sup> while the latter has published a description of the humanly-fashioned specimens discovered in the Middle Glacial Gravel which overlies the Red Crag.<sup>2</sup> It is now proposed to give an account of the artefacts found in the Chalky Boulder Clay surmounting the Middle Glacial Gravel, and to thus establish the fact of the occurrence of undoubted works of man in each of these hitherto supposedly pre-human deposits. In the course of his researches the author has become indebted to Sir Ray Lankester, F.R.S.; Professor J. E. Marr, F.R.S.; Mr. E. T. Lingwood; and Mr. Henry Ogle,<sup>3</sup> to all of whom he offers his grateful thanks for the help they have afforded him. It is proposed to deal with the discoveries upon which this paper is based under two heads, and in the following order, viz. :—

- (a) The Geological Data.
- (b) The Humanly-Fashioned Flints.

## THE GEOLOGICAL DATA.

The discoveries to which this paper relates have been made at three sites occurring in or near the town of Ipswich, and will be referred to as Pit No. 1, Pit No. 2, and Pit No. 3.

### *Pit No. 1.*

This excavation is situated in the upper brickfield of Messrs. A. Bolton & Co., Ltd., and on the right hand or east side of Henley Road (*see* Ordnance Survey Map,

<sup>1</sup> Lankester, Sir E. Ray, *Phil. Trans.*, Series B, Vol. 202, pp. 283-336. Moir, J. Reid, *Proc. P.S.E. Anglia*, Vol. I, Part I, pp. 17, 43; Vol. II, Part I, pp. 12-31.

<sup>2</sup> Moir, J. Reid, *Proc. P.S.E.A.*, Vol. I, Part III, pp. 307-319.

<sup>3</sup> The author also received much and invaluable help from the late Dr. W. Allen Sturge.



Suffolk (East), LXXV, 7. The pit is shown in Field 433). The surface of the ground in the immediate vicinity of the pit reaches a height of 155 O.D., and forms part of the plateau in this particular district. The pit is excavated in typical bluish Boulder Clay containing a large number of rounded, and generally striated, boulders and lumps of white chalk, a fair quantity of black and grey flint of fine quality, and the usual derived fossils and foreign rocks common to this deposit.<sup>1</sup> The Boulder Clay at this spot is 16 to 18 feet thick, and, towards its upper surface, which is covered only by a thin capping of humus, it presents zones of decalcification which have assumed—on a small scale—a formation similar to the pipes often observable in the chalk; and where decalcification has taken place, the glacial clay has been transformed into a reddish and somewhat sandy loam. A small excavation in the floor of the pit shows a few feet of sand containing chalk grains, and this is, in all probability, the usual deposit which, in the particular district under discussion, occurs beneath the Chalky Boulder Clay and separates it from the underlying Middle Glacial Gravel.

There can be no doubt that, as is recognized by the geologists who have made an examination of the section, the pit exhibits typical, unstratified and undisturbed plateau Boulder Clay.

#### *Pit No. 2.*

The second deposit of Boulder Clay to be described is situated about half a mile to the west of the pit just mentioned. It overlies the Middle Glacial Gravel in what is known as Messrs. Bolton & Co.'s sand-pit (*see* Ordnance Survey Map, Suffolk (East), LXXV, 7. The pit is shown in Field 441), and this gravel has furnished the various humanly-fashioned flints described in a former paper.<sup>2</sup> The Boulder Clay in this pit averages 6 to 8 feet in thickness, and is separated from the underlying Middle Glacial Gravel by a fairly persistent series of beds consisting of (a) sand, and (b) compact loam.<sup>3</sup> Towards the south side of the pit the Boulder Clay thins out, and is replaced by what can best be described as a "sludge," composed largely of remade Boulder Clay, and it was under this deposit that the remains of the Ipswich Man were found.<sup>4</sup> The surface of the ground surrounding the pit under discussion reaches a level of about 126 O.D., so that there is a fall of approximately 29 feet in the ground level from the site of the excavation previously described. Messrs. Bolton & Co.'s sand-pit, in fact, lies just within the lip of the Gipping Valley. The Boulder Clay at this spot, which towards its surface exhibits the usual decalcification, differs from that of the upper pit in that it is of a yellowish colour, and

<sup>1</sup> Both in this pit, and in Nos. 2 and 3, pieces of wood are often found embedded in the Boulder Clay.

<sup>2</sup> Moir, J. Reid, *Proc. P.S.E.A.*, Vol. I, Part III, pp. 307-319.

<sup>3</sup> A series of borings has been made by Messrs. Bolton & Co., Ltd., in the field immediately above the pit, and the glacial clays found to increase rapidly in thickness towards the north.

<sup>4</sup> Moir, J. Reid, *Journ. Roy. Anthropol. Inst.*, Vol. XLVII, 1917, p. 375.



in places, on the north face of the pit, shows in its lower portion a well-marked stratification which can be observed in the photograph accompanying this paper (Pl. I). It will be noticed also that this stratification extends to the underlying loam and sand. The stratification of these beds is roughly horizontal, and truncates that of the underlying "Middle Glacial" Gravel, which is highly inclined. It would thus appear that an unconformity is here present, and this may be of importance as indicating the occurrence of an hiatus between the laying down of the Middle Glacial Gravel, and the deposition of the superjacent Boulder Clay and associated beds. The author has for years held the view that such an hiatus in all probability occurred because of the marked differences observable between the flint implements derived from the Middle Glacial Gravel, and those from the Chalky Boulder Clay. These differences are of such a fundamental character, as will readily be seen when the two series are compared, that it would appear to be unlikely that the beds containing them were laid down, as it were, simultaneously. For it is held by some geologists,<sup>1</sup> and their views are entitled to receive due respect, that the Middle Glacial Gravel of Suffolk represents the outwash fan of the glacier responsible for the laying down of the Chalky Boulder Clay, which was deposited as the glacier advanced over this outwash fan. The author has been fortunate in having the opinion of Professor J. E. Marr, F.R.S., upon this somewhat critical section exposed in Messrs. Bolton & Co.'s sandpit, and it is as follows:—

"The Boulder Clay series, including its basal sand bed, is marked by approximately horizontal stratification, while the mid-glacial deposits are highly inclined. When I examined the section, the latter showed an eroded syncline of considerable lateral extent, the upper part of which had been denuded before the deposition of the basal bed of the Boulder Clay series. This might be due to false bedding in a channel, but the extent of the syncline and its general character seemed to be opposed to this, and to suggest that the mid-glacial beds had actually been folded before the deposition of the upper series. If this be the case, it would point to the existence of an unconformity of some importance." But, whatever may be the exact interpretation to be placed upon these particular beds, it is certain that the clay in which the humanly-worked flints occur contains a considerable number of boulders and lumps of striated chalk, together with an appreciable quantity of grey and black flint, and the usual derived rocks and fossils common to the Boulder Clay in the Ipswich district. Thus, so far as can at present be seen, the deposit under discussion was laid down during what is known as the Chalky Boulder Clay glaciation. In places where the Boulder Clay is decalcified, the contained flints have become partially covered with peculiar white markings (this applies in a lesser degree to the specimens found under similar conditions in Pits Nos. 1 and 3), and these, in some instances, are seen to be present upon the cortex as well as upon the fractured surfaces. As

<sup>1</sup> See, for instance, Harmer, F. W., *The Glacial Geology of Norfolk and Suffolk*, p. 20.



the pit has been extended towards the north, it has been noticed that the loam<sup>1</sup> and sand underlying the Boulder Clay is occasionally contorted and twisted, and many pieces of coprolite and cetacean bones, derived from the base of the Red Crag, have been found immediately under the Boulder Clay when it rests upon the aforementioned loam. These specimens very frequently exhibit markings upon their surfaces, which appear to have been eaten into by some substance, and these markings are of a similar meandering nature to those already mentioned as occurring upon certain of the flints in the Boulder Clay.

### *Pit No. 3.*

The third and last deposit of Boulder Clay with which this paper deals is exposed in a large pit on the western or right-hand bank of the River Gipping at Claydon, a place situated about 5 miles to the north-west of Ipswich. The surface of the ground in the immediate neighbourhood of the pit, which is worked by Messrs. F. Mason & Co., Ltd., Cement Manufacturers, lies at a level of about 90 O.D., and the excavation occurs just within the Gipping Valley. The Boulder Clay at this spot, at the only place where its base is exposed, is upwards of 25 feet in thickness, and is buttressed up against an almost vertical cliff of white chalk. The glacial clay here rests upon an uneven surface of chalk, but in no other part of the pit is this latter bed to be seen, and the thickness of the Boulder Clay can only be conjectured. But it is possible that it may be as much as 40 to 50 feet in vertical depth.<sup>2</sup> The Boulder Clay is covered by only a few inches of humus, and in places towards its surface is decalcified irregularly. The deposit under discussion is formed of an unstratified mass of typical bluish Boulder Clay, containing large numbers of boulders and lumps of striated chalk, examples of the usual derived rocks and fossils, and a fair quantity of blocks and pieces of grey and black flint, sometimes of a considerable size. There can be no doubt but that the Boulder Clay exposed in the pit at Claydon is *in situ* and undisturbed. An examination of a representative series of the flaked flints from the Boulder Clay of the Ipswich district,<sup>3</sup> such as the author has now been able to examine, will show that the vast majority of them are unabraded, and do not exhibit any marked colour-change of their surfaces. They present, in fact, an appearance such as is associated with flint implements found in brick-earths or derived from undisturbed floors, or occupation levels. It would thus appear probable that these humanly-flaked flints occurring in the clay were lying in or upon a land surface in the same way as flint implements rest in or upon the present surface of the ground. It would appear also that the glacier responsible for the deposition of the Boulder

<sup>1</sup> The author has found in this loam certain calcareous concretions which have been identified by Professor Marr as "race."

<sup>2</sup> Recent excavations at this pit have shown this to be the case.

<sup>3</sup> The Boulder Clay implements are very rare, and great patience is needed in searching for these specimens.



Clay advanced over this ancient land surface, and incorporated the humanly-fashioned flints with its bottom moraine as it moved along.

The flint implements and flakes are scattered through the mass of the Glacial Clay, and rest at all angles in their matrix.

The striations to be observed upon the varying rocks—including flint—in the Boulder Clay are interesting and instructive. It is clear that the softer rocks, such as chalk and certain other derivatives, have been severely striated, and this applies also to the comparatively soft outside crust or cortex of the flint nodules. But when an examination is made of the very hard fractured surfaces of the Boulder Clay flints, scratches are often entirely absent, or are of negligible size and quantity. In fact, the difference between the number and size of the striations to be observed upon the cortex of some flints, and those exhibited by the fractured surfaces of the same specimens, is very remarkable. The author has noted this difference in a large number of flints, and it appears to be an almost constant phenomenon so far as the flints in the Boulder Clay of the Ipswich district are concerned. If these specimens had been flaked as we now see them, when the marked striations upon their cortices were imposed, the flaked surfaces would also show a large number of small striæ, and this opinion is supported by certain experiments carried out by the author with a view to ascertaining the amount of pressure needed to impose a scratch upon a surface of broken flint (Moir, *Science Progress*, No. 44, April, 1917, pp. 597-603). The view that these Boulder Clay flints were striated before the flaking to be observed upon them was accomplished, is supported further by the fact that in some cases the striæ on the cortex terminate abruptly at the edges of the flake-scars, and it seems, certain that these latter have cut into an older striated surface. In some rare cases a flint older than the normal humanly-fashioned specimens in the Boulder Clay has been found showing deeply patinated and human surfaces, and these surfaces are seen to be somewhat heavily striated. Moreover, an examination of these striations shows clearly that they are in that condition described by the author as "weathered-out." That is to say that, as with many of the flints exposed upon the present land surface, the thin plates of shattered flint caused by the initial impact of the agent of striation have been removed by atmospheric effects (Moir, *Science Progress*, No. 44, April, 1917, pp. 597-603). But when the striæ exhibited upon the fractured surfaces of the normal flints in the Boulder Clay are examined, it is at once observable that these are not weathered-out. These striæ have never in all probability been exposed to atmospheric conditions, until their removal at the present day from the Boulder Clay, and represent the amount of striation which has been imposed upon the flaked surfaces of the flints during the formation of this deposit. Thus the author believes it to be highly probable that the flints under description had been subjected to striation before they were found and fashioned into implements by a race of people living before the Boulder Clay was laid down, and that during the sojourn of the specimens in this glacial deposit, very few striæ were imposed upon them.



As will be seen when the Boulder Clay artefacts come to be dealt with, these specimens approximate in their form and flaking to some of the implements of the Mousterian-Palæolithic epoch. It is also to be remembered that in a former paper<sup>1</sup> the discovery was announced of Chellian-Palæolithic implements in the Middle Glacial Gravel underlying the Boulder Clay. Thus it would appear that these deposits are not so ancient, culturally, as has hitherto been supposed. But the author would like to make it clear that he is referring solely to the beds which he has examined in the Ipswich district, and he puts forward no claim regarding the cultural age of similar beds in other parts of the country. It is, however, perhaps permissible to point out that, in the opinion of Professor Penck and Dr. Rutot, the Chellian phase occurred in the Second Interglacial period intervening between the Mindelian and Rissian glaciations. This Interglacial epoch the late Professor James Geikie named "Helvetian," and was of the opinion that it was represented in part by the Middle Glacial Beds. Again, the same continental geologists place the Mousterian phase during the Rissian (Third Glacial) epoch. This glaciation was named by Geikie "Polandian," and in his opinion was responsible for the deposition of the Upper Boulder Clay.<sup>2</sup> Dr. Holst, too, when visiting Ipswich some four years ago, told the author that in his opinion the Boulder Clay was of Mousterian date, and this view he has since published.<sup>3</sup> Finally, Harmer, Boswell,<sup>4</sup> and others have shown that the river valleys of Norfolk and Suffolk were in existence before the deposition of the Boulder Clay, which wraps over from the plateaux and is found to within a few feet of the present floors of the valleys, and this fact perhaps affords corroborative evidence in favour of the suggestions put forward as to the Mousterian age of the upper Boulder Clay. But whatever may be the cultural age of this bed, the main object of the foregoing account of the pits from which the flint implements to be described have been recovered, is to demonstrate that the deposits exposed in these pits form part of an undoubted Glacial Clay, extending over a wide area in the Ipswich district. Professor J. E. Marr, F.R.S., who has recently visited, with the author, the pits described in this paper as No. 1, No. 2, and No. 3, is of opinion that the Boulder Clay exposed in these sections is *in situ* and undisturbed, and forms part of the sheet of Glacial Clay known as the Chalky Boulder Clay of the Ipswich district.

#### THE HUMANLY-FASHIONED FLINTS.

Before dealing with the flint implements selected for description and illustration in this paper, it is necessary to establish the fact that these specimens were without

<sup>1</sup> Read before the Royal Anthropological Institute by the author in June, 1918.

<sup>2</sup> British Museum. *Guide to the Antiquities of the Stone Age*, p. 11. 2nd edn., 1911.

<sup>3</sup> Holst, Nils Olaf, "The Ice Age in England," *Geol. Mag.* Decade VI, Vol. II, Nos. 615-17, p. 505.

<sup>4</sup> Boswell, P. G. H., "The Age of the Suffolk Valleys," *Quart. Journ. Geol. Soc.*, Vol. LXIX, No. 276, pp. 581-620.



doubt derived from the deposits of Boulder Clay which have been described in the foregoing pages. In the first place, then, the author can state that many of the flints have been removed by him from newly-exposed, undisturbed Boulder Clay, while he has found others lying in the pits (either on or in the talus of the sections, or in lumps of clay which have been excavated) under circumstances which make it in the highest degree probable that the specimens rested originally in this glacial deposit. The remainder of the artefacts have been found and handed to him by workmen employed in the excavations, and of these specimens also he entertains no doubt that they were derived from the Boulder Clay. But the flints discovered in Pit No. 3 have in every case been found by the author himself. To this testimony, however, must be added that afforded by the peculiarities of the exposed sections in the excavations. In Pits Nos. 1 and 3, the Boulder Clay is capped only by a few inches of surface soil, and this surface soil does not contain flint implements such as are here to be described. In Pit No. 2 the Glacial Clay is covered in places by the "sludge" already mentioned, but the flint implements referable to this latter deposit, and to a floor which occurs sporadically at its base, are quite different from the Boulder Clay specimens.<sup>1</sup> Lastly, the Boulder Clay flints themselves present certain marked characteristics which serve to distinguish them from those of other horizons in the pits mentioned. The majority of the specimens do not exhibit any colour change, and have dull, lustreless surfaces. Where the cortex or outside crust of the flint is left it is seen to be thin, and where unstriated, of a smooth texture. The specimens in the Boulder Clay which have suffered colour change are even more differentiated from the flints occurring at other horizons in the pits under description. For these specimens exhibit a remarkable "basket-work" pattern upon their surfaces (Pl. II, Fig. 1),<sup>2</sup> which, in the Ipswich district, appears to be found only upon stones in the Boulder Clay. Thus, the author feels no hesitation in stating that the flint implements now to be described were derived, without doubt, from this glacial deposit. But, before proceeding to describe these specimens, it is necessary to say that though two groups of flints exhibiting differently coloured surfaces occur in the Boulder Clay, no evidence has been forthcoming that this dissimilarity indicates any difference in age. The forms and flaking of the two groups is of the same order, and no specimen has yet been found showing by its re-working that one group is older than the other. In fact, the difference in colour to which attention has been drawn is ascribed by the author as being due to the nature of the matrix in which any particular flint has lain. This appears at present to be the only conclusion to be drawn from the facts at his disposal.

As has already been mentioned, the flint implements from the Boulder Clay

<sup>1</sup> This floor has already been described by the author. See *Journ. Roy. Anthropol. Inst.*, Vol. XLVII, 1917, pp. 367-412.

<sup>2</sup> The greater part of the expense of the blocks for the coloured plate has been generously incurred by the Trustees of the Percy Sladen Fund.



approximate in their forms and flaking to some of the artefacts of the Mousterian-Palæolithic epoch. It is now known that the principal implements of this cultural phase are the *racloir* and *pointe*, and these are also the dominant forms in the Boulder Clay industry.<sup>1</sup> The Mousterian implements are in nearly every case made from flakes struck from prepared cores, and these flakes exhibit on one of their surfaces the truncated flake-scars of the parent block, and on the other, the plain fracture-surface and bulb of percussion produced when the flake was removed from the core. Again, the Mousterian artefacts generally exhibit a peculiar smooth retouching of the edges which, when regarded from the bulbar side of the specimens, are seen to be very straight and symmetrical. This peculiarity is due to the fact that the Mousterian flaker delivered his flake-removing blows very near to the edge of the flint, with the result that thin flakes were detached. The flakes being thin, the *arêtes*<sup>2</sup> are not prominent, and the smoothness of the appearance of the retouching and the straightness of the edge are explained. Another characteristic of the edge-flaking of Mousterian implements is the large number of "resolved" flake-scars exhibited by it. These particular flake-scars show at the point furthest removed from that upon which the blow fell which produced them, a small step or ledge,<sup>3</sup> which is due to the Mousterians being in the habit of delivering their blows at a low angle to the more or less flat surface upon which they impinged. And this the author has proved many times in the experimental fracture of flint. All the foregoing and constant characteristics of the Mousterian flint implements, the Boulder Clay artefacts show in greater or lesser degree, and it seems, therefore, quite fair to state that these latter specimens approximate in their forms and flaking to those of the Mousterian phase. But the author does not wish to convey the impression that the specimens, to which this memoir relates, exhibit the excellence of workmanship and symmetry of form of the finest examples of the Mousterian culture, and it must be stated that up to the present, only one specimen classifiable as a platessiform implement (sometimes described as a *coup de poing*) has been found in the Glacial Clay, and this specimen (Fig. 7) is not comparable with the fine examples of this type of implement found in some early Mousterian deposits. Nevertheless, it must be recognized that the implements now to be described exhibit a combination of characteristics to be observed in a more perfect state upon the artefacts of a well-known phase of pre-historic culture, and that such characteristics are regarded as affording conclusive evidence of human skill and intention.

<sup>1</sup> The author submitted some of these specimens to the late Dr. W. Allen Sturge, who expressed the opinion that some of them were very Mousterian in character and comparable to the rougher specimens found at High Lodge, near Mildenhall, Suffolk.

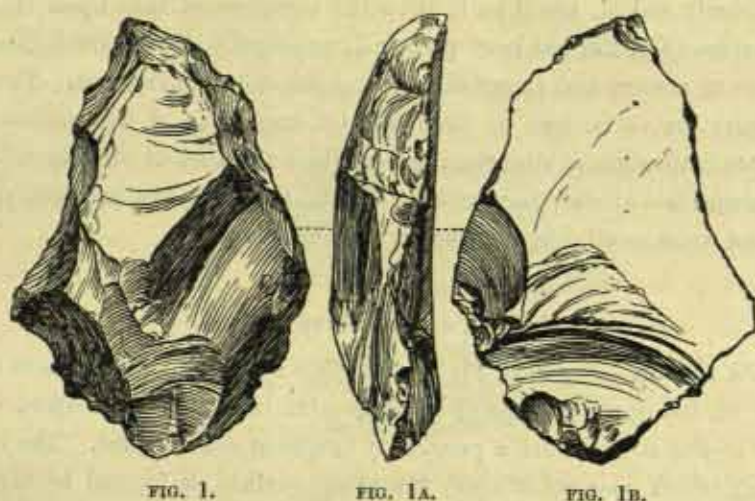
<sup>2</sup> The term *arête* is used to denote the ridges between the various flake-scars. It has no reference to the cutting-edge of the implement.

<sup>3</sup> The author has already given a description of resolved flakes. See *Proc. P.S.E.A.*, Vol. II, Part IV, p. 537.



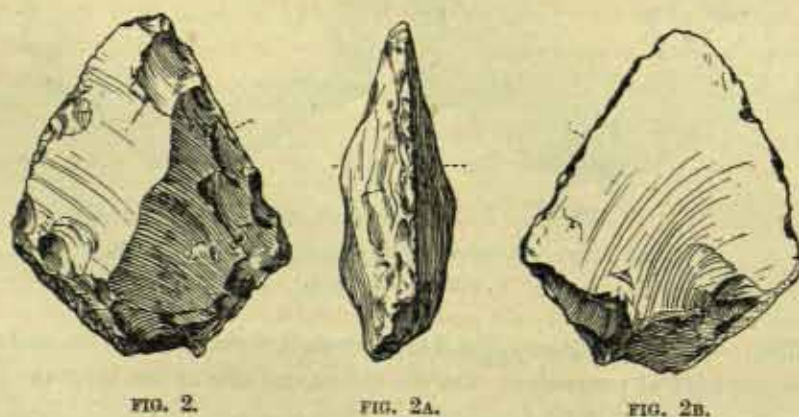
*Pointes.*

Figs. 1, 1A and 1B.—Found in Pit No. 1. This specimen, which is made from a flake struck from a previously-prepared core, exhibits on its upper surface (Fig. 1) several truncated flake-scars, the pointed form being obtained by means of the careful removal of small flakes along its somewhat steep edges (Fig. 1A). The under surface (Fig. 1B) shows the flat, truncated fracture-surface produced when the flake was removed from the parent block of flint, and two other flake-scars, one of which,



THREE VIEWS OF *pointe* FROM CHALKY BOULDER CLAY, PIT NO. 1.  $\times \frac{3}{4}$ .

on the left-hand side, appears recent, and was caused, in all probability, by a blow from the workman's pick when excavating the Boulder Clay. The specimen exhibits little, if any, abrasion, and no incipient cones of percussion (due to collision with other hard objects) are observable upon it. A few striæ, the nature of which it is



THREE VIEWS OF *pointe* FROM CHALKY BOULDER CLAY, PIT NO. 2.  $\times \frac{3}{4}$ .

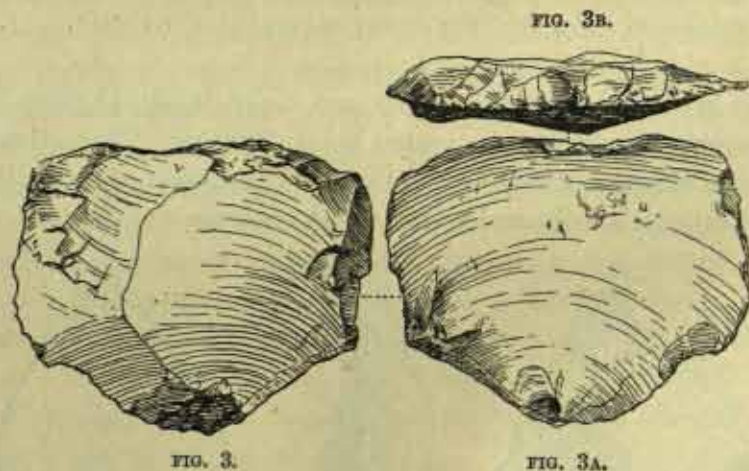


only possible to divine by means of a powerful lens, are developed upon the upper and lower surfaces of the implement. The flint is of a greyish-black colour and carries a fairly well-marked glaze.

Figs. 2, 2A and 2B; Pl. II, Fig. 1.—Found in Pit No. 2. This specimen is made from a flake exhibiting on its upper surface (Fig. 2) two large flake-scars, the convergence of which has given rise to a more or less central ridge. On the right-hand side of this ridge the edge has been modified by the removal of flakes, many of which are "resolved" (Fig. 2A). The edge to the left-hand side of the ridge is not so extensively flaked, nor does it show the steepness of that upon the right. The under surface (Fig. 2B) has been produced, principally, by a blow falling upon a flat platform of cortex, and shows a bulb of percussion and *écaillage*. Two other small flake-scars are to be seen at the lower left-hand side of this surface. The specimen shows little signs of abrasion, and exhibits the curious streaky coloration to which reference has already been made. The flint shows a few incipient cones of percussion, and some small, and not very prominent, striae.

#### *Racloirs, or Side Scrapers.*

Figs. 3, 3A and 3B.—Found in Pit No. 2. This specimen is made from a flake, and exhibits on its upper surface (Fig. 3) several truncated flake-scars, demonstrating that it was struck from a previously prepared core of flint. The cutting-edge (Fig. 3B), which encroaches upon the upper surface, is formed by somewhat

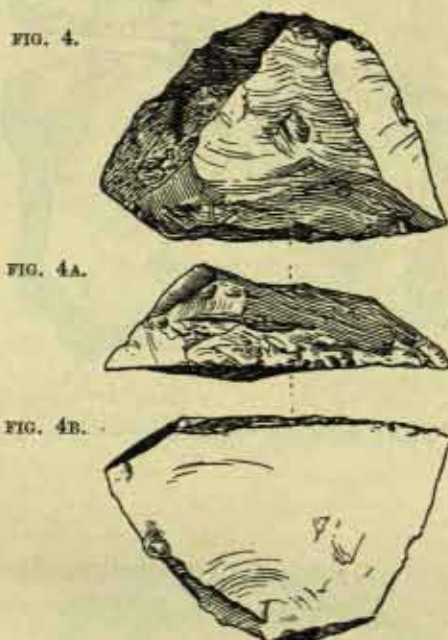


THREE VIEWS OF *racloir* FROM CHALKY BOULDER CLAY,  
PIT NO. 2.  $\times \frac{1}{2}$ .

steep flaking. The lower surface (Fig. 3A) has been formed by one blow, and exhibits a well-marked bulb of percussion. On the right-hand side of this bulb the edge has been flaked into a small hollow or *encoche*. This specimen is interesting as showing the streaky coloration upon its upper surface, while the lower surface, which is

obviously of the same age, exhibits the almost unaltered colour of the flint. The implement does not carry any incipient cones of percussion or striæ upon its surfaces.

Figs. 4, 4A and 4B.—Found in Pit No. 1. This specimen is made from a flake struck from a previously-prepared block of flint, as its upper surface (Fig. 4) shows the truncated remains of other flake-scars. The cutting-edge (Fig. 4A), which is somewhat steep, has been made by careful flaking, and is very straight and symmetrical. The lower surface (Fig. 4B) has been formed by one blow, and exhibits



THREE VIEWS OF *racloir* FROM CHALKY BOULDER CLAY,  
PIT NO. 1.  $\times \frac{1}{2}$ .

a prominent bulb of percussion. At the right-hand side of this bulb the edge has been flaked into a small hollow or *encoche*. On the right-hand side of the upper surface occurs a patch of striated cortex. The implement, which is made of grey flint, is quite unabraded, unweathered, and exhibits neither incipient cones of percussion nor striæ upon its surfaces.

#### *Scrapers of Ordinary type.*

Figs. 5, 5A and 5B.—Found in Pit No. 2. This specimen is made from a flake and exhibits on its upper surface (Fig. 5) several truncated flake-scars, demonstrating that it was struck from a previously prepared block of flint. The cutting-edge



(Fig. 5A), which encroaches upon its upper surface, is steep, and some of the flake-scars by which it is formed are resolved. The lower surface (Fig. 5B) is formed principally by one large flake-scar, the bulb of percussion of which has been removed in the formation of the cutting-edge of the implement. The lower surface exhibits on its left-hand side a small hollow or *encoche*, while on the right the edge has been



THREE VIEWS OF SCRAPER OF ORDINARY TYPE FROM  
CHALKY BOULDER CLAY, PIT NO. 2.  $\times \frac{1}{2}$ .

modified by the removal of a few flakes. Two small patches of cortex-like material are observable upon the upper surface (Fig. 5). The specimen exhibits a small amount of the usual streaky coloration, and some striæ and incipient cones of percussion are visible upon it. The *arêtes* on the upper surface are somewhat abraded.

Figs. 6, 6A, 6B and 6C.—Found in Pit No. 3. This specimen is made from a largish nodule of flint, as cortex is observable upon both its upper and lower surfaces. The upper surface (Fig. 6) exhibits several large truncated flake-scars, and is encroached upon by the cutting-edge (Fig. 6C), which has been formed by the careful removal of a number of flakes. The lower surface (Fig. 6B) is formed principally by one large flake-scar markedly concave in form, but one or two other minor flake-scars are visible upon this surface. The specimen, which was found *in situ* by the author, 25 to 30 feet from the surface, may be said to be quite unabraded and unweathered. It has no incipient cones of percussion upon its surfaces, and only three or four striæ are observable upon it. At the lower left-hand corner of the upper surface (Figs. 6 and 6A) several flakes have been removed with the apparent intention of making a hollow.

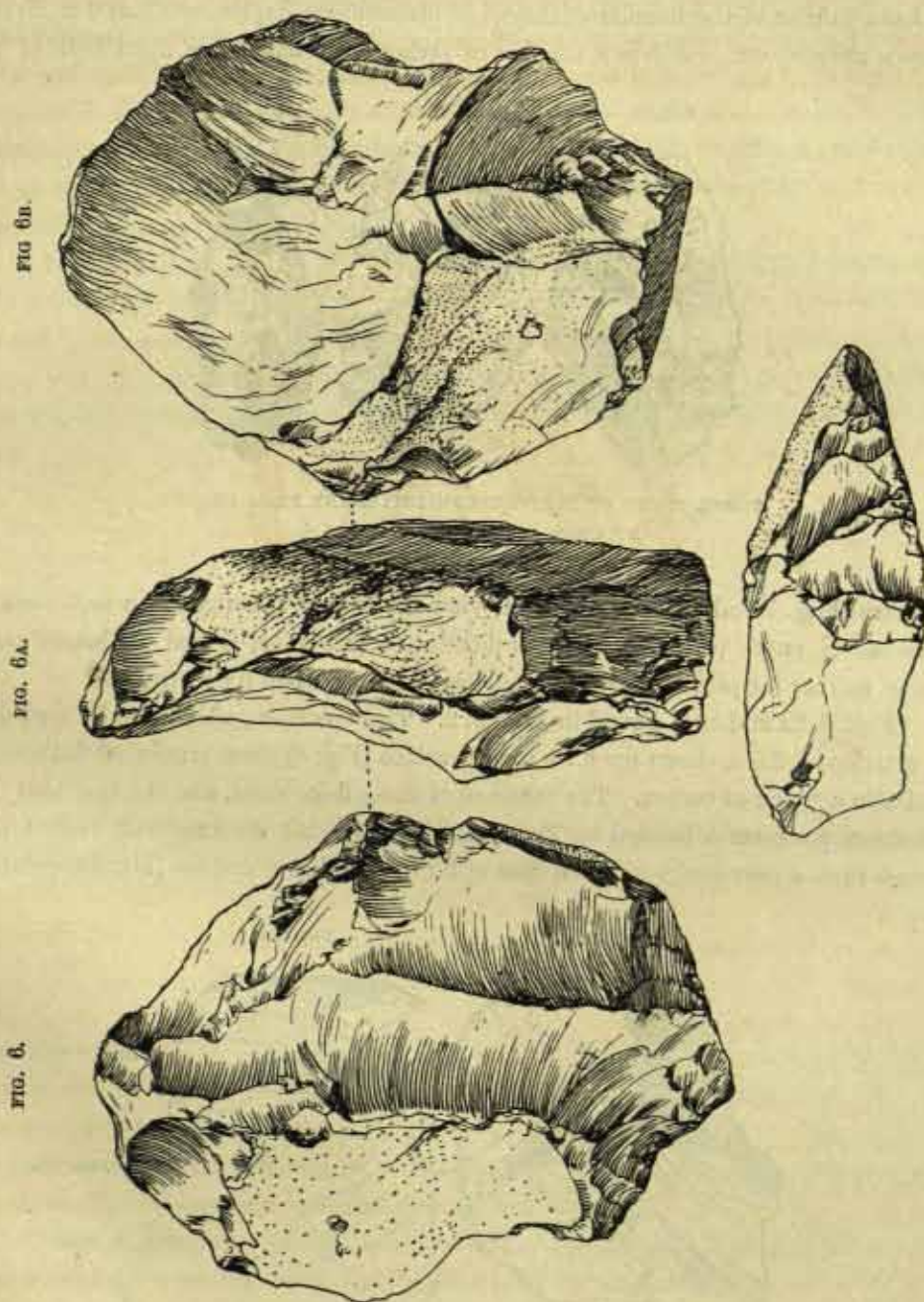


FIG. 6A.  
FIG. 6B.  
FIG. 6C.  
FIG. 6.  
FOUR VIEWS OF SHAPER OF ORDINARY TYPE FROM CHALKY BOULDER CLAY, PIT NO. 3.  $\times 1$ .



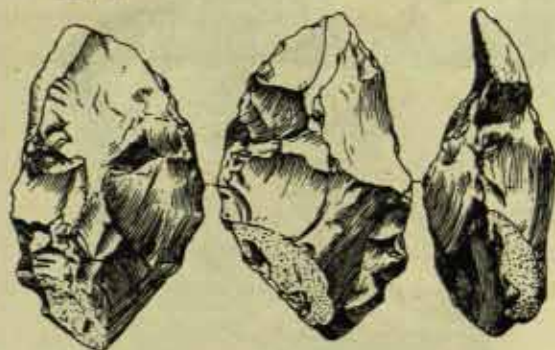
*Other Forms of Implements.*

Figs. 7, 7A and 7B.—Found in Pit No. 2. This specimen, which approximates in its form to that of the rougher examples of platessiform implements found in river-terrace gravels, etc., exhibits a number of rather large flake-scars upon both of its

FIG. 7.

FIG. 7A.

FIG. 7B.



THREE VIEWS OF PLATESSIFORM IMPLEMENT FROM CHALKY  
BOULDER CLAY, PIT NO. 2.  $\times \frac{1}{2}$ .

surfaces (Figs. 7 and 7A), while the side view shows that the edge has a well-marked reversed S curve (Fig. 7B). The implement is unweathered and unabraded, and shows neither incipient cones of percussion nor striæ upon its surfaces.

Figs. 8, 8A and 8B.—Found in Pit No. 2. This specimen, which may be regarded as a trimmed flake, shows upon its upper surface (Fig. 8) three truncated flake-scars and also a patch of cortex. The presence of these flake-scars, and the fact that the specimen possesses a faceted striking-platform (Fig. 8A), demonstrates that it was struck from a previously prepared core of flint. The lower surface (Fig. 8B) exhibits

FIG. 8.

FIG. 8A.



FIG. 8B.

THREE VIEWS OF FLAKE FROM CHALKY BOULDER CLAY, PIT NO. 2.  $\times \frac{1}{2}$ .

a well-formed bulb of percussion, and *écaillage*. The flint, which is of the grey variety, carries a moderate glaze, and exhibits regular and small flaking round three of its edges, and it is noticeable that the blows responsible for this modification were delivered sometimes upon the upper and sometimes upon the lower surface. The portion of the edge where cortex is present also exhibits secondary flaking. The specimen shows upon its lower surface a number of small and erratically placed striæ, but carries no incipient cones of percussion. The flint is little abraded, but it does not present the "new" and unaltered condition possessed by most of the artefacts from the Boulder Clay.

Figs. 9 and 9A.—Found in Pit No. 2. This specimen, which may be regarded as a trimmed flake, exhibits upon its upper surface (Fig. 9) two truncated flake-scars, the convergence of which has given rise to a well-marked median ridge. At one end of this surface (the end used as a striking-platform) a small patch of cortex-like material is present, while at the lower end a curious ferruginous stain

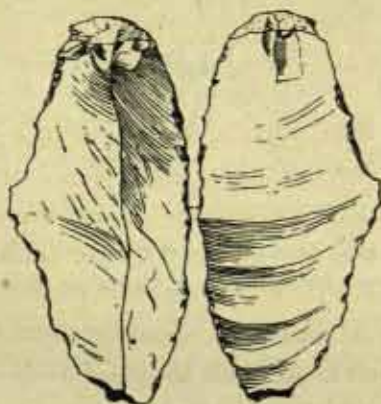


FIG. 9.

FIG. 9A.

TWO VIEWS OF FLAKE FROM CHALKY BOULDER CLAY,  
PIT NO. 2.  $\times \frac{1}{2}$ .

is observable. The lower surface (Fig. 9A) exhibits very little trace of a bulb of percussion, but shows an *écaillage* and some prominent ripple-marks. The two longer edges of this flake have been modified by very minute flaking. The specimen, which is glossy black in colour, carries one or two small striæ upon its lower surface, but otherwise is quite unabraded and unworn.

Figs. 10 and 10A; Pl. II, Figs. 2 and 2A.—Found in Pit No. 2. This specimen was removed from the decalcified Boulder Clay by the author's trained quarryman, John Baxter. It occurred at a depth of 5 feet, and would seem to be a very important discovery. The specimen is a flake showing fracture-surfaces of two very clearly-marked periods upon its surfaces. The upper surface (Fig. 10; and Pl. II, Fig. 2A) exhibits two truncated flake-scars, which are coloured a dark chestnut brown, and



numerous weathered-out striæ. This surface, too, is much abraded, a condition very noticeable upon the almost central ridge. The under surface (Fig. 10A; and Pl. II, Fig. 2) shows a nearly flat striking platform, and very prominent and well-formed bulb of percussion and *écaillage*. This surface exhibits numerous weathered-out striæ, and, towards its lower end, an area of abrasion. Thus far, it would appear that the specimen under consideration is a quite typical example of an early river gravel flake,<sup>1</sup> such as has been found in great quantities in various parts of this country. But when an examination of the edge-flaking is made, its significance becomes at once apparent, for this edge-flaking shows the streaky coloration

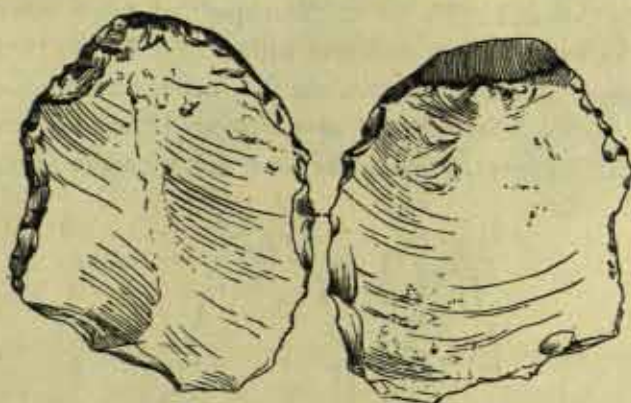


FIG. 10.

FIG. 10A.

TWO VIEWS OF ANCIENT, OCHREOUS FLAKE, WITH LATER EDGE-FLAKING,  
FROM THE CHALKY BOULDER CLAY, PIT NO. 2.  $\times \frac{2}{3}$ .

of many of the Boulder Clay artefacts, and, moreover, beyond any doubt or question, cuts into, and is therefore later in age than, the older chestnut-brown surfaces. The author regards this specimen as of such importance as to justify the portrayal of it in colours (Pl. II, Figs. 2 and 2A) so that it may be possible for archaeologists to judge for themselves of its significance. If it is possible to say with certainty that the older flaked surfaces of this flint are referable to the Early River-Drift period, when the platessiform implements of the Chellian stage were made, then it becomes clear that the Boulder Clay in Pit No. 2 at Ipswich was laid down *after* the period in question had passed away.

The chief points of this paper may be briefly summarized as follows:—

1. The deposits described in Pits No. 1, No. 2 and No. 3 are without doubt Glacial Clays such as have formerly been regarded as forming part of a widespread sheet of Chalky Boulder Clay.
2. It may be regarded as established that the flints described in this paper have, without exception, been derived from these deposits of Glacial Clay.

<sup>1</sup> A number of broken flints, showing a similar coloration to this flake, occur in the Boulder Clay in each pit described.



3. The specimens described exhibit flake-scars such as are usually regarded as affording conclusive evidence of human intention, and approximate in their forms and flaking to some of the Early Mousterian Palæolithic artefacts.
4. One specimen found in the Boulder Clay in Pit No. 2 is an ancient flake such as occurs in the earliest river-terrace gravels. This flint, however, exhibits edge-flaking later in date than that of the major fractures, and this secondary work shows the peculiar streaky coloration observable upon a certain number of the humanly-fashioned flints in the Boulder Clay.
5. If this particular flake can be assigned definitely to the Early River-Drift, Palæolithic period, then it is certain that the Boulder Clay from which the specimen was derived was laid down at a later date than that of the period in question.
6. It must be clearly understood that this paper deals solely with the Glacial Clays, and contained flint implements and flakes found in the three pits described, and that the conclusions arising therefrom do not necessarily apply to other areas where similar deposits occur, which have not been examined by the author.

NOTE.—Since the above paper was completed the author has found in the Boulder Clay of the Ipswich district the three specimens to which this note draws attention. It will be noticed that in each case the specimens are what is known as “flake-implements” which were struck from specially-prepared cores, or nuclei. Such flake-implements are found in some number in Mousterian deposits, and are recognized as typical of this cultural phase. Their chief characteristics are the numerous truncated flake-scars upon their upper surfaces, and the plain area of fracture, with bulb of percussion, forming the lower surface.

The specimen illustrated in Figs. 11, 11A and 11B, was found by the author *in situ* at a depth of 8 feet in the Chalky Boulder Clay in Mason's Pit, Claydon (Pit No. 3).

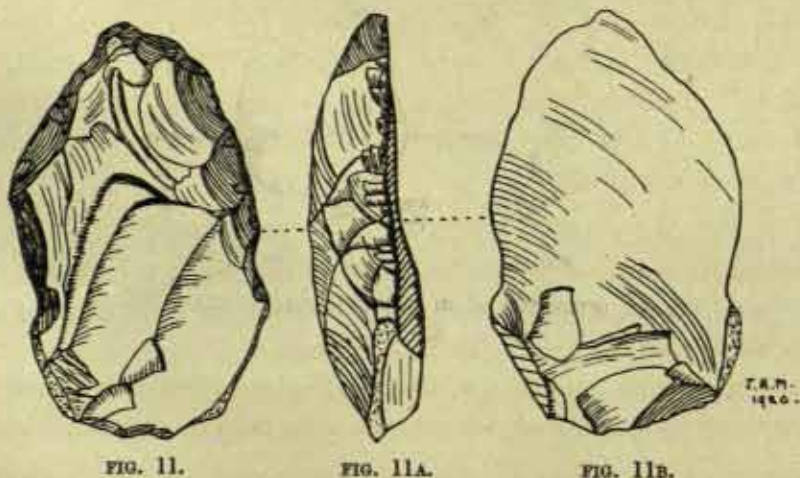


FIG. 11.

FIG. 11A.

FIG. 11B.

FLAKE IMPLEMENT FROM CHALKY BOULDER CLAY, PIT NO. 3.  $\times \frac{2}{3}$ .



This implement (Figs. 11, 11A and 11B) may be compared with that found in Pit No. 1 (Figs. 1, 1A and 1B), which it resembles rather closely. The implement shown in Figs. 12 and 12B was found by the author in the Boulder Clay exposed in Bolton & Co.'s Pit (Pit No. 2), Ipswich, while that illustrated in Figs. 13 and 13B was recovered by him in Mason's Pit, Claydon (Pit No. 3). Each of these implements exhibits the usual "condition" and appearance of the Boulder Clay specimens such

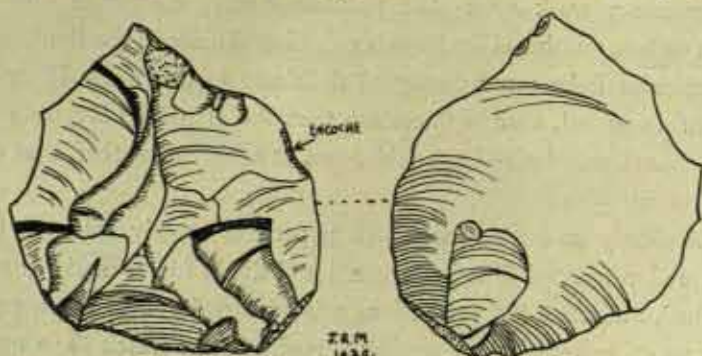


FIG. 12.

FIG. 12B.

FLAKE IMPLEMENT FROM CHALKY BOULDER CLAY, PIT NO. 2.  $\times \frac{3}{4}$ .

as have been described in the above paper. It is of interest to notice that many of the Boulder Clay artefacts possess one or more *encoches* (see Figs. 12 and 12B), which are again characteristic of the Mousterian Culture (Comment, "*Les hommes contemporains du Renne*," p. 81, Fig. 26). Up to the present, the type of core from which these Boulder Clay flake-implements were struck has not been found.

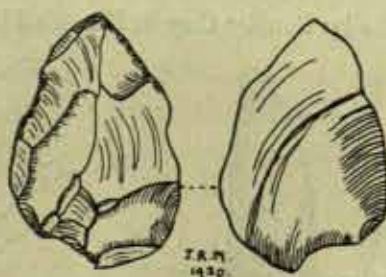
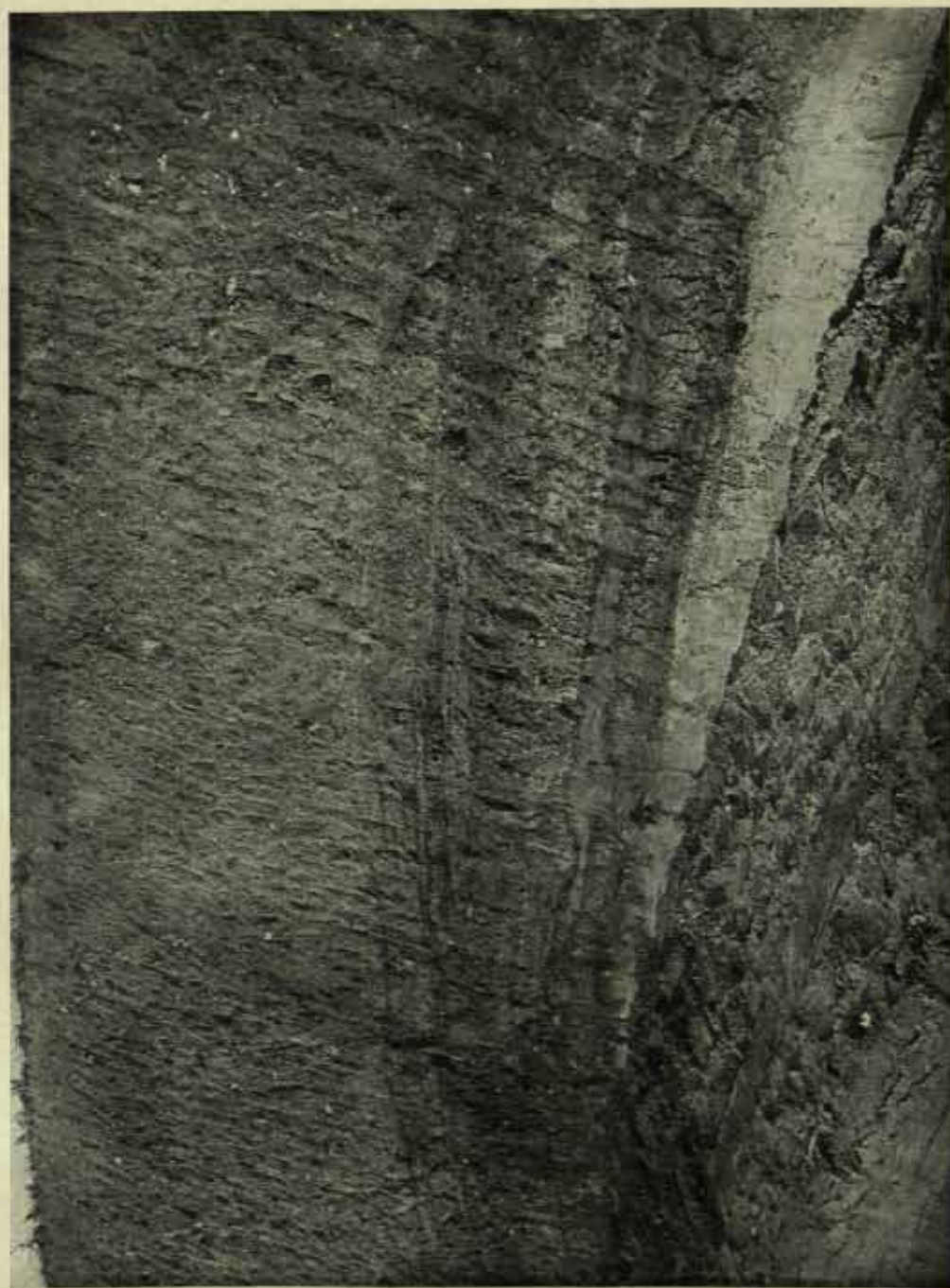


FIG. 13.

FIG. 13B.

FLAKE IMPLEMENT FROM CHALKY BOULDER CLAY  
PIT NO. 3.  $\times \frac{3}{4}$ .

PLATE I.



Surface soil 6 in.

Chalky Boulder Clay  
4 to 5 feet.

Thin layers of sand  
and loam 2 to 4 in.  
Loam 2 to 4 in.

Ledge cut by  
workmen.

Loam 7½ in.

Boulder Clay  
4 to 9 in.

Sand 3 to 6 in.

Grey Loam 6 in.  
to 1 foot.

Yellow Sand 6 in.  
to 1 foot.

VIEW OF PART OF NORTH FACE OF PIT NO. 2, SHOWING CHALKY BOULDER CLAY SERIES OF DEPOSITS.

ON THE OCCURRENCE OF FLINT IMPLEMENTS OF MAN, ETC.





FIG. 1.

FIG. 2.

FIG. 2A.



FIG. 1. UPPER SURFACE OF FLINT *pointe* [SEE ALSO TEXT FIG. 3] EXHIBITING STREAKY COLOURATION. FROM CHALKY BOULDER CLAY, PIT No. 2.

FIGS. 2 AND 2A. TWO VIEWS OF OCHREOUS FLAKE [SEE ALSO TEXT FIGS. 10 AND 10A], SHOWING LATER EDGE-FLAKING, EXHIBITING STREAKY COLOURATION. FROM CHALKY BOULDER CLAY, PIT No. 2.

ON THE OCCURRENCE OF FLINT IMPLEMENTS OF MAN IN THE GLACIAL CHALK BOULDER CLAY OF SUFFOLK.





## BIRD-CHARIOTS AND SOCKETED CELTS IN EUROPE AND CHINA.

By C. G. SELIGMAN, M.D., F.R.S.

A PARTICULAR type of wine vessel on wheels, representing a bird, has long been familiar to those interested in Chinese bronzes. The type, well represented by a specimen in the Victoria and Albert Museum (No. 183—'99, figured by Bushell, *Chinese Art*, I, Fig. 56), is called by the Chinese *chiu ch'ê tsun*, "dove-chariot vase," and according to the Japanese manual the *Shin-Sho Sei*, is as old as the Han dynasty (B.C. 206–220 A.D.). "The bird of mythological aspect, which is supposed to represent a dove (*chiu*), has its tail curved downwards, and a trumpet-shaped vase-mouth strengthened by vertical ridges on its back; it is engraved with scroll ornament and dragons, and displays on its breast a grotesque head moulded in relief. Two wheels support it at the side, and a smaller one at the tail, adapting it to circulate on the altar during the performance of ancestral ritual ceremonies."<sup>1</sup> Fig. 1 is a reproduction from the *Shin-Sho Sei* (Part I, p. 19) of an example of this type of vessel, said to be of Han age.

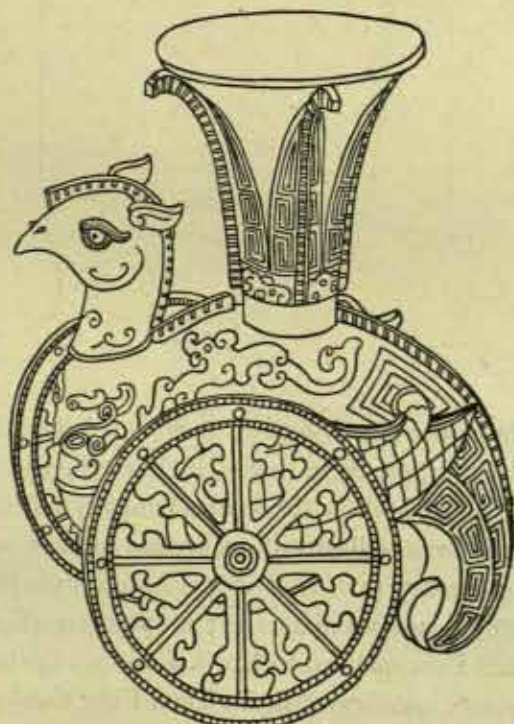
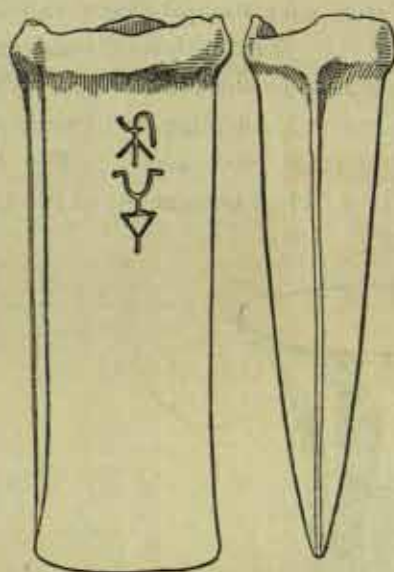
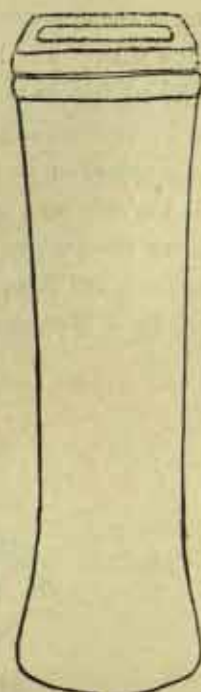


FIG. 1.

<sup>1</sup> Bushell, *op. cit.*, I, pp. 91, 92.



I have not been able to learn the precise purpose to which these vessels were applied, but from Bushell's statement they are or were used in the ceremonies of ancestor worship. Their shape is sufficiently remarkable to induce speculation as to their origin; it is true that birds and animals on wheels occur elsewhere, notably in Central and Northern Europe during the Bronze Age, but from here to China seems a far cry, and it is only lately that I have recognized that there is evidence which points to definite cultural communication between Europe and China in the Bronze Age. This evidence is offered by the distribution of the socketed celt. This essentially European tool is absent from Egypt, Asia Minor, Iran and India.<sup>1</sup>

FIG. 2.  $\times c. \frac{1}{2}$ .FIG. 3.  $\times \frac{1}{2}$ .

It occurs in Southern Russia (the Ukraine), in Siberia (especially in *khurgan* of the Yenesei basin), in the northern Shan States, in Burmah, Cambodia and in China. Here they have been found both in the south (Yunnan) and the north (Tsinanfu), while certain specimens are inscribed with an archaic form of script which may well be dated to the Chou dynasty (B.C. 1122-225). An example (Fig. 2) in the British Museum (1911, 10-25.5) bears two characters; no specimen is figured in the *Pokutu* or in the *Shin-Sho Sei*, but I am indebted to Mr. B. J. Koop alike for referring me to the representation of the specimen figured in the *Tuan Fang Catalogue* and for the copy of this which is here reproduced (Fig. 3).

<sup>1</sup> The authority for this statement, as far as Asia Minor, Iran, and India are concerned, is Déchelette, cf. *Manuel d'Archéologie*, II, p. 254.

This distribution indicates that the socketed celt reached China by a trans-Siberian land route, and not south of the Himalaya or by sea.

I may now return to the "bird-chariot," as Déchelette calls the bird on wheels. The European form differs from the Chinese dove-vases in that the birds are mounted on four wheels as in the excellent example portrayed by Hoernes<sup>1</sup> (reproduced, slightly modified, as Fig. 4 of this note), or when this is not the case are perched on the Y-shaped prolongation of the pole attaching the latter to the axle of the two-wheeled chariot, which in form rather resembles a gun carriage, the socket for the pole representing the trail.

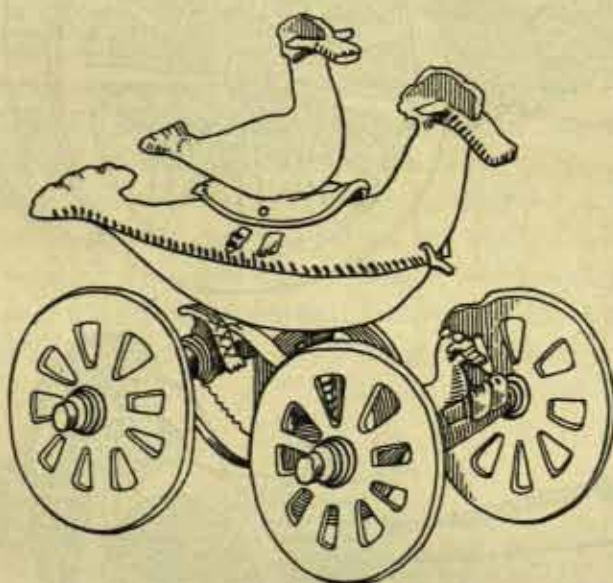


FIG. 4.

Animal- as apart from bird-chariots are of course well known, the most celebrated being the Trundholm solar chariot with a horse on wheels drawing a representation of the sun disc.

All these European chariots are of the Bronze Age ; according to Montelius, the Trundholm chariot dates to about 1300 B.C.<sup>2</sup> It may be presumed that the bird-chariots are approximately of the same date, while according to Déchelette it is to the fourth and final period of the Bronze Age, lasting from 1300 to 900 B.C., that the socketed celt must be attributed.<sup>3</sup>

Besides the "dove-chariot vase" there is another form of bird on wheels figured in the *Pokutu* (Vol. 27, pp. 44 and 45), and also in the *Shin-Sho Sei*, reproduced here as Fig. 5. This is a naturalistic representation of a bird which may well

<sup>1</sup> *Natur und Urgeschichte des Menschen* (1909), II, Fig. 207.

<sup>2</sup> Déchelette, *op. cit.*, II, p. 416.

<sup>3</sup> *Ibid.*, p. 106.



represent a pigeon or a dove, but it bears one or two entirely unnatural representations of smaller birds (I shall speak of these as accessory birds, they may perhaps be thought to represent its young) on its back or breast. It is slung low between two wheels, does not bear a vessel on its back or any conventional pattern, the surface of the

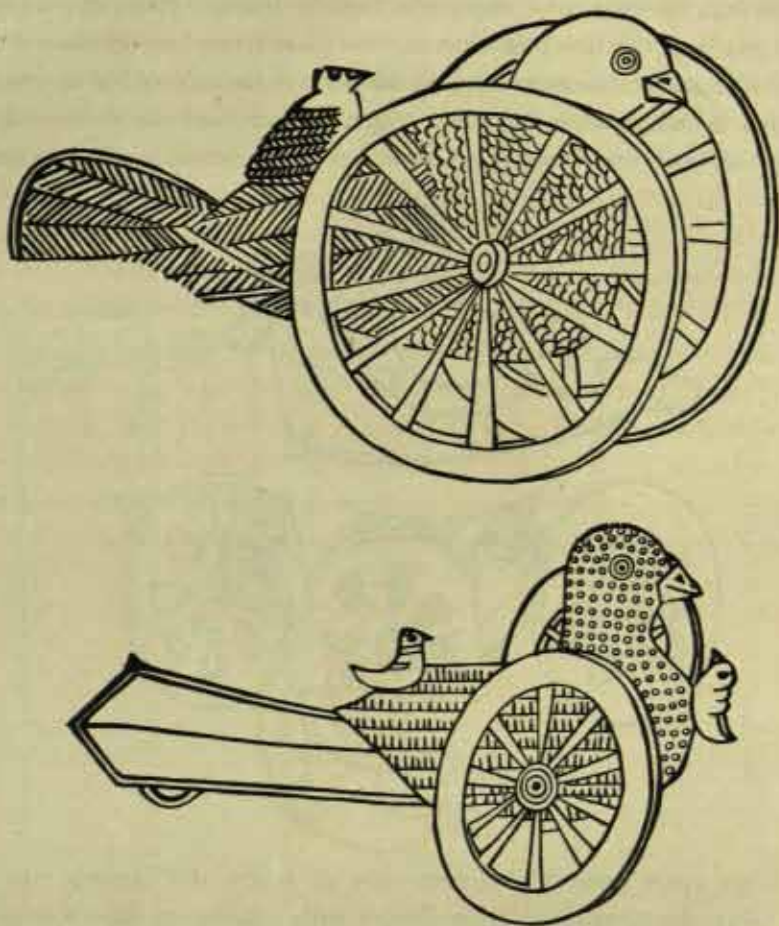


FIG. 5.

body being graved to give a more or less naturalistic rendering of the feathers. According to Chinese authorities, this form of bird-chariot also dates from the Han period.

Turning to the European example of Bronze Age date (Fig. 4) it will be noted that a small and not very obvious bird is represented between the front wheels of the chariot, and that the lid covering the opening in the body of the main bird supports a smaller bird of similar type.

The resemblance of the small accessory birds of the T'ang bronzes to these subsidiary birds of the European bird-chariot is very striking, and considering the migration of the socketed celt from West to East can scarcely be accidental, but

must, I suggest, be attributed to transmission during the latter part of the Bronze Age.

There is even a parallel to the Trundholm chariot to this extent, that although animal-chariots are not, as far as I can ascertain, figured in any ancient Chinese work, there is in the Cernuschi Museum in Paris a ram on wheels, and though this specimen is archaistic rather than archaic, it at least shows that animal- as well as bird-chariots are not unknown to the Chinese, though, as pointed out to me by Mr. Koop, it may be a late copy, the wheeled base being an addition not contemplated at an earlier date. Concerning this specimen I am indebted to M. d'Ardenne de Tizac, Conservator of the Museum, for the following particulars. It stands about 30 cm. high, and is 45 cm. in length; head and feet bear a conventional design. The body, which is hollow, is graved with a scale design, and in the middle of the back is a movable lid bearing a grasshopper as handle; M. de Tizac considers that the specimen is of T'ang age, though of an older type.

Lest it should be thought that I have laid too much stress on the actual morphological similarities in these Western and Eastern bird-chariots and that these may be due to coincidence, let me adduce another piece of evidence showing the persistent linkage of the bird and chariot as well as the tendency of the two to spread together into foreign cultures. The cauldron on wheels, or the cauldron-chariot, as it may be



FIG. 6.  $\times 2$ .

called, is a well-known Bronze Age antiquity of Central and Northern Europe.<sup>1</sup> This became associated with birds as in the example in Vienna Museum,<sup>2</sup> and this association was so strong that it persisted at least until the third or fourth century B.C., for on some of the coins of the Greek city state Krannon—as that represented in Fig. 6—there is represented a jar occupying the space between the wheels of a chariot, upon one of which there perches a bird.

*Conclusions.*—(1) The bird-chariot in China, as shown by native records, is of considerable but not extreme antiquity, probably dating back some two thousand years.

<sup>1</sup> Cf. e.g., Déchelette, *op. cit.*, II, Fig. 107, p. 285.

<sup>2</sup> Figured by Déchelette, *op. cit.*, II, Fig. 183, p. 442.



(2) It is not Chinese in origin, but was derived from the bird-chariots of the later Bronze Age of Europe.

I desire to express my thanks for much kindly help to Messrs. Reginald Smith and R. L. Hobson, of the British Museum, and to Mr. A. J. Koop, of the Victoria and Albert Museum, without which it would have been impossible to give the necessary precision to the idea here set forth. I am also indebted to Mr. L. C. Hopkins for endeavouring to read the characters on the socketed celt in the British Museum.

*Postscript.*—Since putting together the above paper I have become aware of a paper by Berthold Laufer, "The Bird-Chariot in China and Europe," published in the *Boas Anniversary Volume* (New York, 1906). Laufer figures the two dove-chariots of T'ang age reproduced in this paper, but besides these, he also reproduces another example of white nephrite from the *Illustrated Book of Ancient Jades*, which was compiled in 1176 and published in 1779. Moreover, he figures a third bronze dove-chariot of T'ang age from the *Hsi' ch'ing ku chien* (the great catalogue of Kien Lung), with three small accessory birds, obviously representing the young, since one of these, clinging to the mother bird's breast, is beak to beak with it as though being fed.

Laufer (*op. cit.*, p. 421), in discussing the significance of the Chinese dove-chariot, points out that the native records indicate that it was unknown in the days of greatest antiquity, and that it "did not make its appearance before the era of the Han dynasty—a period in Chinese art in which large waves of foreign elements burst over the native ideas. It was the time when . . . Siberian or old Turkish art exercised a far-reaching influence on that of China, and new motives imported from abroad held full sway over the then Chinese artists."

As I have done, he suggests a connection between these dove-chariots and the European cult-chariots of the Bronze Age, but considers that not much stress should be laid on this similarity since "unfortunately, among the antiquities of Siberia no such bird-chariots have hitherto been discovered."

Laufer makes no mention of the socketed celt of bronze, nor does he specially draw attention to those European bird-chariots, such as that shown in Fig. 4 with a smaller bird as lid handle on its back, which so well explain the accessory birds on the dove-chariots figured by both of us.

## THE COLOUR INDEX OF THE BRITISH ISLES.

By F. G. PARSONS, F.R.C.S.

AMONG the more important indications of race which anthropologists use are the colours of the skin, hair, and eyes; but most of us who have tried to observe these are conscious of the many difficulties in estimating them and, later on, of expressing them in such a way that a comparison with other people's work may be easy and fairly accurate.

I do not apologize for a moment for bringing up a subject which has been discussed so often before. The fact that it is admittedly in an unsatisfactory state fully justifies us in reviewing it from time to time, and it seems to me that the present is a very opportune time, because I think that I see signs of a much wider popular interest in Anthropology than there has been, and of the subject appealing to a widening circle of trained observers who should realize where we have failed in the past, in order that they may help us where we need their help most in the future.

The present subject divides itself into two parts. Firstly, what we shall look for and record; secondly, how we shall arrange our records when obtained.

I do not propose to discuss the skin coloration now, although it is undoubtedly valuable: it needs deliberate investigation, and should be estimated on a covered part like the upper arm as well as on the face, hands and nails.

With the hair and eyes the matter is different: here a practised observer will be able to register, at a glance, the colour and consistence of the former, and the colour, approximately, of the latter; and in this way a much larger number of individuals in a given area can be observed than would be possible if each had to be interviewed separately and the object of the inquiry explained.

At one time I was doubtful whether observations taken at random in the street or market-place could be accurate enough to enable one to construct a workable colour index from them; but a careful analysis of Beddoe's results, obtained in this way, makes me believe that, with him at least, the method was valuable, and I have been able to check his results on more than one occasion with very slight discrepancies. Of course it is better to examine each individual carefully and at leisure, as may be done in hospitals and barracks; and still better is it to take only such cases as are known to have sprung from ancestors who have inhabited the district for two or three generations; but this is a counsel of perfection, and few people have either the time or the opportunity to collect a sufficient mass of material in this way to allow a fair average to be taken.



There is no doubt, however, that a large number of observations, taken quickly though they be, by one observer is of far greater value than an equal number, taken by many different observers, however carefully they may have been able to go into the matter. The personal equation plays such an important part and is so difficult to allow for.

As far as the hair is concerned, most observers are inclined to recognize five tints: fair, red, brown, dark brown, and black, but the difficulty is to draw the line between them.

Personally I agree with every word which Beddoe wrote on the definition of these tints, in *The Races of Britain*, but I would urge that the most important thing is to settle the border line between brown and dark brown, and the best suggestion I can make is that dark-brown hair is hair which at first suggests black, but on closer inspection is not black. Where there is doubt the colour of the eye-brows and any hair there may be on the face should be taken into account, and it must be borne in mind that almost all the agencies acting on the hair of the lower orders tend to darken it. Grease, sweat, and dirt are the commonest of these, and an observer will usually do well to lean towards the lighter rather than the darker tint in difficult cases.

The definition of red hair, too, is often very difficult, but I think that any real suggestion of ruddiness should be included, particularly if it is borne out by the hair of the face or eyebrows.

The eyes of a passer-by are always more difficult to estimate than the hair. In a former paper on German prisoners of war (*Journ. Roy. Anthropol. Inst.*, 1919, p. 20) I have called attention to the way in which the various pigmented shades succeed one another from the pupillary to the peripheral margin of the orbit, and I have suggested the advisability of classing all eyes in which there is as much as a ring of brown pigment as dark; but this can only be applied when the chance occurs of looking carefully into the eye, which is usually impossible with strangers. Beddoe, apparently, solved the difficulty by having three divisions—light, dark, and neutral—and into the latter went all the eyes about which he was uncertain. Probably this is the most satisfactory thing to do as long as the eyes have been really seen and a difficulty felt in making a decision between light and dark; but it will falsify results if eyes which have not been seen at all are included in this group, because I propose later on to divide it equally between light and dark: a proceeding which will be fair enough with eyes about which an observer cannot make up his mind, but certainly not fair with eyes which have not been seen, because there are very few parts of Great Britain where dark eyes are as numerous as light.

If, then, we can agree to divide our material, as so many observers have done, into fair, red, brown, dark brown, and black hair, and light, dark, and neutral eyes, it now remains for us to decide what value we will give these different tints.

Before suggesting anything new let us see whether none of the existing methods



is satisfactory. There is the method favoured by German anthropologists of taking the percentage of the so-called mixed blond or mixed brown type, that is to say, the percentage of people with light hair and eyes or dark hair and eyes, neglecting the rest. I tried this method when working out the nigrescence of the different provinces of Germany, but found it unsatisfactory because it was possible sometimes to prove, by taking the percentage of blonds, that area A was fairer than area B, and then, by taking the percentage of the browns, that area A was darker than area B.

An imaginary record will make my meaning clear :—

|                       |     |     |     |     | A.        |     | B.        |
|-----------------------|-----|-----|-----|-----|-----------|-----|-----------|
|                       |     |     |     |     | Per cent. |     | Per cent. |
| Light hair and eyes   | ... | ... | ... | ... | 25        | ... | 20        |
| Light hair, dark eyes | ... | ... | ... | ... | 25        | ... | 30        |
| Dark hair, light eyes | ... | ... | ... | ... | 25        | ... | 30        |
| Dark hair and eyes    | ... | ... | ... | ... | 25        | ... | 20        |

It therefore seemed to me that no index which did not take into account the intermediate types was likely to prove satisfactory, and I would here protest very strongly against the practice of estimating the nigrescence of a race by examining children, even when it is allowed that they are, on an average, much fairer-haired than adults. I think that most people who have studied the matter will agree with me that some fair-haired children are potential brunettes, while others remain fair all through life. With the eyes, on the other hand, I do not think that there is much appreciable darkening after the first year. I have every reason to believe, after studying children's eyes in baby clinics, that less than one per cent. of English children are born with dark eyes; and the Sister of the maternity ward at St. Thomas's Hospital assures me that she has only seen two cases of children born there with dark eyes. The English child at birth has lead-blue eyes, and a careful investigation will always show a faint ring of white pigment surrounding the pupillary margin; the yellow and brown pigments appear later, usually about the third month, if they are to appear at all.

To return to the subject of the construction of an index: when the record of each individual is taken I found the following plan succeed fairly well in my work on German prisoners of war. I divided the observations into "mixed blonds," as Beddoe calls them, or "full blonds" as I would prefer: that is to say, cases in which both eyes and hair are light; into "full browns," with dark hair and eyes, and intermediate types with light hair and dark eyes, or vice versa; then I took twice the percentage of the full browns and added it to the percentage of intermediate types, the argument being that those cases in which both hair and eyes were dark should count twice the value of those in which there was only one dark ingredient.

The difficulty, of course, was where to draw the line between dark and light hair, and I drew it, as in all other methods, between brown and dark brown.

In practice, later on, I found it less cumbersome to halve the result or to take the number of full browns added to half the number of intermediates.



This is quite a useful method when each person's dossier is complete, but it does not lend itself to records in which only the percentage of each hair tint is given and the percentage of light, dark, and intermediate eyes; here we cannot tell how the eyes and hair were combined in any particular individual, and a different index must be used.

Beddoe's plan was to construct an index on the hair alone by taking the percentage of the dark-brown hair and adding it to twice the percentage of the black, subtracting from the sum the combined percentage of the red and fair hair.

The results he got from this method were, I confess, a great advance on those obtained by the Anthropometric Committee of the British Association in 1883, and agreed roughly with those of the military authorities. Moreover, they corresponded fairly well with what we know of the distribution of the dark and fair races in our islands, while the Committee's result, obtained by recording the percentages of their mixed blond and mixed brown types, gave a quite meaningless result; but his indices are extremely erratic and vary between  $-14$  and  $+63$ . I think this is largely due to his practice of giving black hair twice the value of dark brown, irrespective of the fact that so many black-haired British people have light eyes and often quite light facial hair. I would gladly agree to give the blue-black hair of the Southern European, accompanied, as it generally is, by equally black facial hair, a double value, but I certainly do not think that the usual black hair of the Englishman has twice the nigrescence of the dark brown.

One of the objects of this paper is to submit that a much steadier and equally reliable index may be obtained by simply taking the percentage of the dark hair and eyes in any race in which there is an admixture of light coloration. With the English race this is particularly important, because since we are derived so largely from two long-headed races, the Mediterranean and the Nordic, we cannot use the cephalic index as our "sheet anchor" in the way we can when dealing with continental peoples. The colour index, however, if we can devise a handy method of expressing it, should give us a clue to the predominance of Nordic or Mediterranean blood in particular localities, while the cephalic index will keep us warned of the presence of any Alpine infusion.

What we want is a system which will harmonize with the facts known already from historical and other evidence, but will be rather less hysterical than Beddoe's, where the difference in the hair indices (unchecked by the eyes) does not really indicate the variation in the degree of darkness in different areas, but does much more.

The index I propose is obtained by adding the percentage of the dark brown and black hair to that of the dark eyes, and dividing the result by two.

If, following Beddoe, we decide to divide the eyes into light, dark and neutral, it will be better to subdivide the latter equally between the light and dark before taking the percentage of the latter.

It is only when taking rapid observations in the highways and byways that the



neutral division is necessary ; when a careful inspection is possible, an eye containing brown pigment in any appreciable amount should be counted as dark ; otherwise as light.

A concrete example of the method will probably make everything clear.

Beddoe records his observations on 100 Carlisle farmers in the following way :—

| Number. | Sex. | Eyes light. |       |        |       |        | Eyes light. | Eyes neutral. |       |        |       |        | Eyes neutral. | Eyes dark. |       |        |       |        | Eyes dark. | Index. |
|---------|------|-------------|-------|--------|-------|--------|-------------|---------------|-------|--------|-------|--------|---------------|------------|-------|--------|-------|--------|------------|--------|
|         |      | Red.        | Fair. | Brown. | Dark. | Black. |             | Red.          | Fair. | Brown. | Dark. | Black. |               | Red.       | Fair. | Brown. | Dark. | Black. |            |        |
|         |      |             |       |        |       |        |             |               |       |        |       |        |               |            |       |        |       |        |            |        |
| 100     | M.   | 4           | 22    | 34     | 11    | 1      | 72          | -             | 2     | 3      | 3     | -      | 8             | 1          | 2     | 5      | 10    | 2      | 20         | -1     |

I have chosen this example because there happen to be exactly 100 observations, and so there is no necessity for converting all the numbers into percentages, as would otherwise be the case. From this record he gets an index of -1 by adding twice the number of the three black-haired individuals to the twenty-four with dark-brown hair, and subtracting the result from the sum of the fair- and red-haired people, which comes to 31. In other words, he gets his index from the colour of the hair alone and ignores the evidence of the eye colour. To get the index I propose I should rearrange his figures in the following way :—

|      |   |            |    |                      |
|------|---|------------|----|----------------------|
| Hair | { | Red ..     | 5  |                      |
|      |   | Fair ..    | 26 |                      |
|      |   | Brown ..   | 42 |                      |
|      |   | Dark brown | 24 | 24                   |
|      |   | Black ..   | 3  | 3                    |
| Eyes | { | Light ..   | 76 |                      |
|      |   | Dark ..    | 24 | 24                   |
|      |   |            |    | —                    |
|      |   |            |    | 51 + 2 = 25.5 Index. |

In doing this I have suppressed his division of neutral eyes by dividing it equally between light and dark. Having submitted this method I will now proceed to test it on Beddoe's material, pausing for one moment to add my tribute of gratitude to him for the laboriously gathered mass of observations which he made in the middle of the last century when locomotion was much less easy and the population less mixed than at present. Every year makes this material more and more valuable, and it is of the greatest importance that we should digest and study it while there is still some chance of verifying doubtful points and supplying the parts which are wanting.

One point which has struck me very strongly in working through Beddoe's figures is that the index of nigrescence in females is usually a good deal higher than



that in the males. Beddoe himself noticed it, but I do not think that he quite realized that it is sufficient to make all the indices, founded on mixtures of the two sexes, of little value.

Fleure and James noticed the same thing among the Welsh people (*Jour. Roy. Anthropol. Inst.*, 1916, p. 50), and described it as an "important sex difference in colour."

In order to gain an idea of the variations in colour between the sexes I have arranged all Beddoe's observations in which the sexes have been recorded separately, in the order of the darkness of the males; placing the female index after that of the male.

|                               | ♂    | ♀     |                               | ♂    | ♀    |
|-------------------------------|------|-------|-------------------------------|------|------|
| (1) Glendale ... ..           | 13.5 | 35.9  | (33) W. Northants ...         | 37.6 | 41.5 |
| (2) Boston (country) ...      | 16.6 | 31    | (34) Worcester (city) ...     | 37.8 | 39.8 |
| (3) Teesdale ... ..           | 18.7 | 34.4  | (35) Colchester (town) ...    | 38.3 | 41.5 |
| (4) Dunse ... ..              | 20.5 | 31.5  | (36) Northampton (town)       | 38.3 | 35.6 |
| (5) Boston (town) ... ..      | 24.4 | 37.5  | (37) London (lower classes)   | 38.3 | 38.7 |
| (6) Hexham (country) ...      | 24.5 | 36.25 | (38) Bristol (middle classes) | 38.4 | 38.9 |
| (7) Whitby ... ..             | 25.5 | 35.2  | (39) Stoke-on-Trent ...       | 38.5 | 35.8 |
| (8) Eyemouth ... ..           | 25.8 | 37.3  | (40) Cambridge (town) ...     | 38.6 | 38.9 |
| (9) Keighley ... ..           | 27.3 | 39.8  | (41) Abergavenny (country)    | 38.6 | 42.5 |
| (10) Southampton ... ..       | 28.2 | 32.7  | (42) Leicester (town) ...     | 38.7 | 40.5 |
| (11) Selkirk ... ..           | 28.3 | 30.3  | (43) Manchester ... ..        | 39.1 | 37.6 |
| (12) Giggleswick ... ..       | 28.8 | 47.1  | (44) Bristol (lower classes)  | 39.4 | 41.1 |
| (13) Plymouth ... ..          | 30.4 | 53.8  | (45) Birmingham ... ..        | 39.7 | 36.4 |
| (14) Athol ... ..             | 30.9 | 37.5  | (46) Gloucester (city) ...    | 40.2 | 46   |
| (15) Horsham ... ..           | 31.4 | 39.5  | (47) Yarmouth regatta ...     | 40.6 | 42.8 |
| (16) Norwich ... ..           | 32   | 35.5  | (48) Hereford (city) ...      | 41.3 | 40.2 |
| (17) Comrie ... ..            | 32   | 36.5  | (49) Merthyr ... ..           | 41.4 | 44.7 |
| (18) Durham (city) ...        | 32.4 | 38.8  | (50) Stratford-on-Avon ...    | 41.8 | 41   |
| (19) Chichester (country) ... | 33.3 | 17.8  | (51) Stranraer ... ..         | 43   | 47.5 |
| (20) Devizes ... ..           | 33.7 | 48    | (52) Falmouth ... ..          | 43.5 | 50.7 |
| (21) Colchester (country) ... | 34.2 | 25    | (53) N. Somerset ... ..       | 44.3 | 38.4 |
| (22) Thirsk ... ..            | 34.3 | 37.9  | (54) Exeter (city) ... ..     | 45   | 42.4 |
| (23) Bredalbane ... ..        | 35.5 | 42.2  | (55) Truro (town) ... ..      | 45.3 | 43.8 |
| (24) Hereford (country) ...   | 35.7 | 43    | (56) St. Austell ... ..       | 45.6 | 47.1 |
| (25) London (upper classes)   | 35.8 | 36.8  | (57) Truro (country) ...      | 45.8 | 50   |
| (26) Glencoe ... ..           | 35.8 | 44.9  | (58) Brecon ... ..            | 47.5 | 52   |
| (27) Burton-on-Trent ...      | 35.9 | 36    | (59) Newlyn ... ..            | 47.7 | 41.7 |
| (28) Forteviot ... ..         | 36   | 43    | (60) Totnes ... ..            | 50   | 47   |
| (29) Ipswich (town) ...       | 36.1 | 32.5  | (61) Redruth ... ..           | 51   | 51   |
| (30) Chichester (city) ...    | 36.1 | 26.1  | (62) Abergavenny (town) ...   | 52   | 41.5 |
| (31) Yeovil ... ..            | 36.3 | 45.7  | (63) Penzance ... ..          | 53   | 49.2 |
| (32) Bristol (upper classes)  | 36.5 | 38.8  | (64) Caermarthen ... ..       | 54.4 | 56.5 |

Arranged in the form of a chart (see Fig. 1), the distance between the male and female index can be seen at a glance, and it will be noticed that the female tracing is usually higher than the male, though not always so. Most of the cases of marked discrepancy between the male and female indices, such as Nos. 19, 21 and 30, are founded on a very small number of female observations, while I think that in

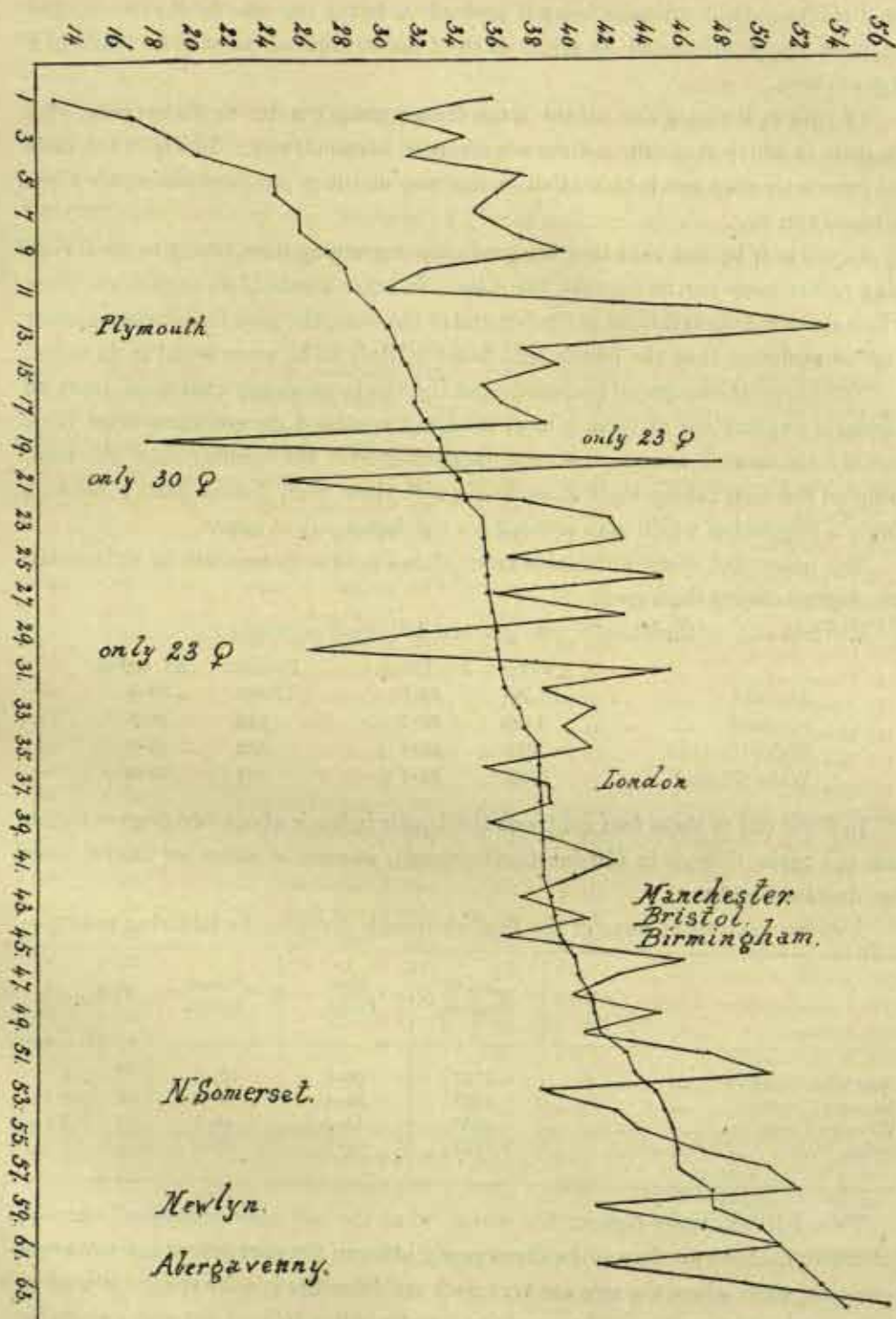


FIG. 1.—COMPARISON OF MALE AND FEMALE COLOUR INDICES.



No. 13 (Plymouth) the female index is probably near the true one for the district and the male one is influenced by the number of sailors from all parts to be found in a large sea port.

Of course, the irregular nature of the female tracing is due to the contrast with the male in which alone the indices are arranged consecutively. In Fig. 2 the male and female tracings are both treated in this way and it is possible to compare them on equal terms.

It will now be seen that they are gradually converging lines, owing to the female being rather more horizontal than the male. In other words, if we neglect the three or four scattered observations at the left end of the scale, the male line shows a greater range of variation than the female, and hence is likely to be more useful as an index.

The observations are so numerous and the tracks so steady that there must be a definite explanation of their course, though I confess I do not know what it is. Possibly the women are more evenly distributed over the country than the men, owing to the men taking their wives home with them from distant parts; but this is only a suggestion which may account for one factor out of many.

The important thing which this chart shows is that women are on an average two degrees darker than men.

Worked out arithmetically, we get the following averages:—

|                    | Males  | Av. Index. | Females. | Av. index. |
|--------------------|--------|------------|----------|------------|
| England ... ..     | 12,583 | 37.3       | 12,681   | 39.4       |
| Scotland ... ..    | 1493   | 29.7       | 640      | 38.6       |
| Wales (Beddoe) ... | 678    | 49.4       | 582      | 51.3       |
| Wales (Fleure) ... | 1852   | 57.1       | 344      | 59.8       |

In three out of these four contrasts the female index is about two degrees higher than the male, though in the fourth (Scotland), where the males are fairest, it is nine degrees higher.

A closer analysis of some of the English records gives us the following result:—

|                            | No. of<br>Records. | Male<br>Index. | Female<br>Index. | Difference. |
|----------------------------|--------------------|----------------|------------------|-------------|
| 4 Northern Counties ... .. | 1767               | 26.2           | 33.5             | 7.3         |
| 3 Eastern Counties ... ..  | 1563               | 34.4           | 38.2             | 3.8         |
| 2 Western Counties ... ..  | 4057               | 45.5           | 46.7             | 1.2         |
| London ... ..              | 6223               | 37.7           | 38.5             | .8          |

This, I think, bears out, on the whole, what the last table suggested, namely, that where the men are fairest the discrepancy between the darkness of the two sexes is greatest, while where the men are very dark the difference is quite small. It may be asked whether the greater darkness of the females is due to hair and eyes equally or whether one of these predominates. In answer to this I found that among 2038 people from the northern counties of England the women were 6.5 per cent. darker

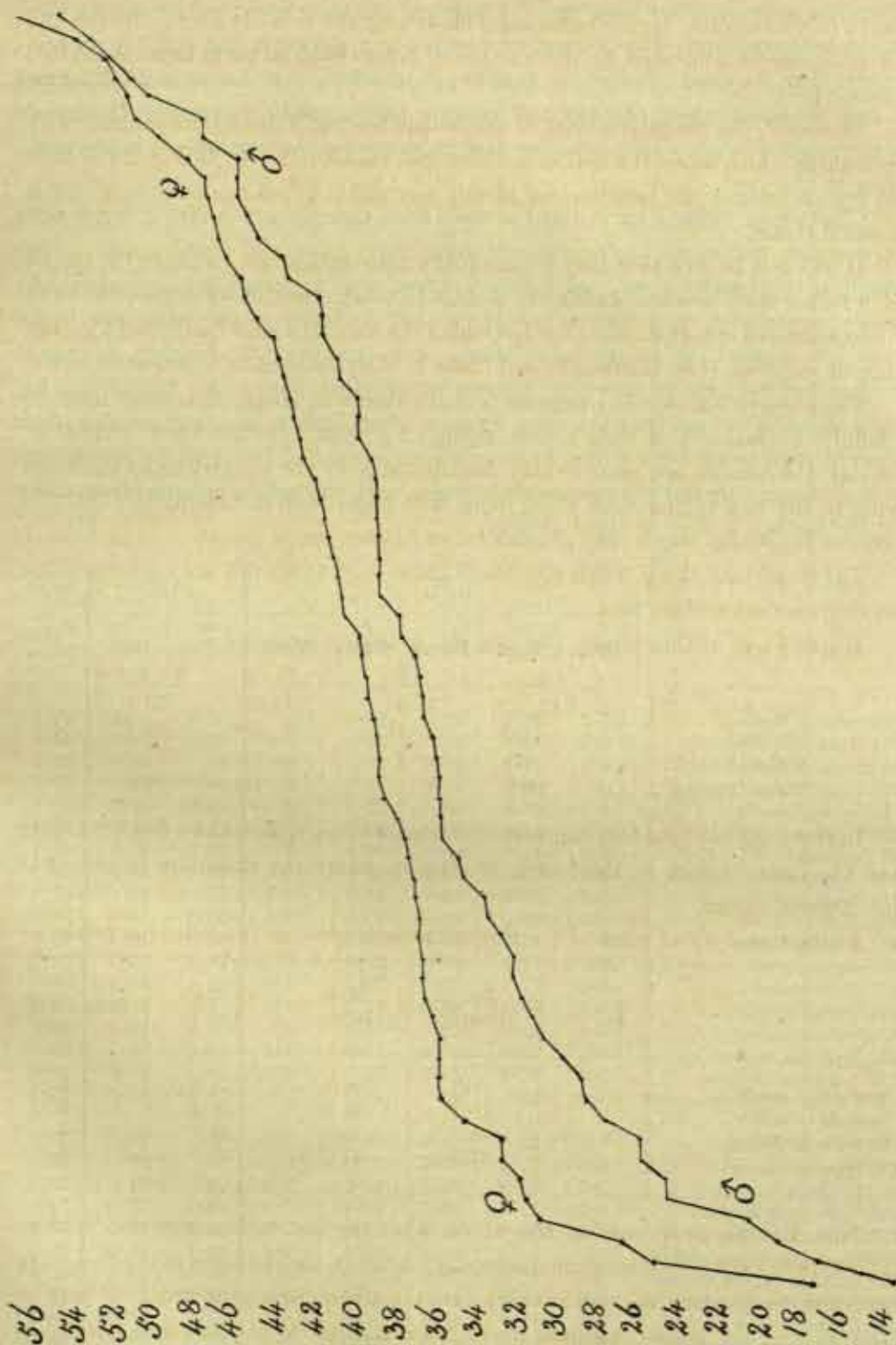


FIG. 2.—MALE AND FEMALE INDICES ARRANGED CONSECUTIVELY AND INDEPENDENTLY OF ONE ANOTHER.



than the males in their hair, and 7.4 per cent. in their eyes; while among 3201 in the western counties, the women were .6 per cent. darker in hair and 1.1 per cent. in eyes than the men. It does not seem to me, therefore, that there is much difference in the responsibility of the hair and eyes for the increased darkness of the female sex, though it is interesting to notice how much greater that darkness is in the north than in the west.

The lesson which I am inclined to draw from these figures is that it is not right to compare indices of nigrescence obtained from males and females with others obtained from males alone, and I would suggest that in future the sexes should be treated separately, or, if time is an object, that the index of any particular region should be worked out on the males alone. This conclusion is annoying, because it renders less valuable an enormous amount of laborious work which Beddoe has left us in which he did not keep the sexes separate; but, luckily, in a large number of his observations, as has been shown, he records them apart and I subjoin the percentages of the various hair and eye colours of the males, with the indices obtained from them, by the method I have outlined already.

|                                     | Hair. |       |        |       |        | Eyes.  |       | Index of Nigrescence. |
|-------------------------------------|-------|-------|--------|-------|--------|--------|-------|-----------------------|
|                                     | Red.  | Fair. | Brown. | Dark. | Black. | Light. | Dark. |                       |
| 48 Glendale farmers ...             | 7.3   | 38.5  | 37.5   | 16.6  | 0      | 89.6   | 10.4  | 13.5                  |
| 105 Hexham (country) ...            | 7.6   | 30.5  | 37.6   | 22.4  | 1.9    | 75.3   | 24.7  | 24.5                  |
| 70 Hexham (town) ...                | 4.3   | 17.9  | 42.1   | 30.7  | 5.0    | 65     | 35    | 35.3                  |
| 100 Cumberland farmers ...          | 5     | 26    | 42     | 24    | 3      | 76     | 24    | 25.5                  |
| 54 Kirkby Lonsdale ...              | 6.5   | 25.0  | 45.4   | 23.2  | 0      | 83.3   | 16.7  | 18.8                  |
| 154 Durham (city) ...               | 6.8   | 23.0  | 36.4   | 28.6  | 5.2    | 69     | 31    | 32.4                  |
| 48 Teesdale ...                     | 6.2   | 47.0  | 30.2   | 16.6  | 0      | 79.2   | 20.8  | 18.7                  |
| 124 Giggleswick ...                 | 5.6   | 15.7  | 51.6   | 26.2  | .8     | 69.4   | 30.6  | 28.8                  |
| 118 Keighley ...                    | 9.7   | 27.9  | 35.6   | 25.0  | 1.7    | 72     | 28    | 27.3                  |
| 150 Thirsk ...                      | 8.7   | 26.0  | 30.3   | 30.7  | 4.3    | 66.3   | 33.7  | 34.3                  |
| 107 Whitby fishers ...              | 3     | 19.7  | 57.6   | 19.7  | 0      | 80.3   | 19.7  | 19.7                  |
| 33 Whitby (town) ...                | 6.5   | 17.8  | 47.7   | 22.9  | 5.1    | 74.3   | 25.7  | 26.8                  |
| 287 Manchester ...                  | 6.0   | 17.3  | 37.5   | 33.2  | 5.9    | 60.9   | 39.1  | 39.1                  |
| 158 Boston (town) ...               | 3.2   | 23.4  | 49.0   | 22.8  | 1.6    | 75.6   | 24.4  | 24.4                  |
| 80 Boston (country) ...             | 5.0   | 37.5  | 43.7   | 13.8  | 0      | 80.6   | 19.4  | 16.6                  |
| 130 Norwich market ...              | 6.2   | 20.0  | 45.0   | 27.3  | 1.4    | 63.9   | 36.1  | 32.4                  |
| 130 Yarmouth regatta ...            | 3.4   | 15.1  | 40.9   | 36.6  | 4.0    | 59.4   | 40.6  | 40.6                  |
| 100 Yarmouth fishermen and sailors. | 1.0   | 22    | 48     | 23.5  | 5.5    | 71.5   | 28.5  | 28.7                  |
| 150 Ipswich farmers ...             | 1.7   | 22.6  | 44.0   | 28.3  | 3.3    | 66     | 34    | 32.8                  |
| 150 Ipswich (town) ...              | 1.3   | 17.7  | 47.7   | 30.0  | 6.3    | 64     | 36    | 36.1                  |
| 66 Colchester (town) ...            | 5.3   | 12.9  | 36.4   | 40.2  | 5.3    | 69     | 31    | 38.3                  |
| 180 Colchester farmers ...          | 4.7   | 17.5  | 43.3   | 29.4  | 5.0    | 66.1   | 33.9  | 34.2                  |
| 130 Cambridge (town) ...            | 1.2   | 15.8  | 47.3   | 33.1  | 2.7    | 58.5   | 41.5  | 38.6                  |
| 1900 London (lower classes)         | 4.0   | 14.4  | 41.8   | 35.1  | 4.6    | 63.1   | 36.9  | 38.3                  |
| 500 London (upper classes)          | 4.8   | 15.8  | 38.9   | 36.6  | 3.9    | 68.8   | 31.2  | 35.8                  |
| 100 Nottingham farmers ...          | 2.5   | 25.5  | 41.5   | 27.5  | 3.0    | 66.5   | 33.5  | 32                    |
| 284 Leicester (town) ...            | 4.2   | 18.7  | 40.1   | 31.9  | 5.1    | 59.7   | 40.3  | 38.7                  |
| 100 Stoke-upon-Trent ...            | 2.0   | 15.0  | 44.5   | 34.5  | 4.0    | 61.5   | 38.5  | 38.5                  |
| 258 Burton-on-Trent ...             | 3.3   | 19.7  | 37.6   | 33.7  | 5.6    | 67.4   | 32.6  | 35.9                  |



|   | Hair. |       |        |       |        | Eyes.  |       | Index of Nigrescence. |
|---|-------|-------|--------|-------|--------|--------|-------|-----------------------|
|   | Red.  | Fair. | Brown. | Dark. | Black. | Light. | Dark. |                       |
| 133 Hereford (city)...                        | 6.4   | 10.5  | 33.1   | 39.9  | 10.1   | 62.8   | 32.7  | 41.3                  |
| 68 Hereford (country) ...                     | 2.2   | 12.5  | 41.2   | 38.2  | 5.9    | 72.8   | 27.2  | 35.7                  |
| 150 Worcester (city) ...                      | 2.0   | 13.7  | 43.0   | 35.7  | 5.7    | 65.7   | 34.3  | 37.8                  |
| 310 Birmingham (city) ...                     | 3.2   | 17.3  | 37.4   | 37.9  | 4.2    | 62.7   | 37.3  | 39.7                  |
| 125 Stratford-on-Avon fair                    | 3.6   | 15.2  | 34.4   | 40.8  | 6.0    | 63.2   | 36.8  | 41.8                  |
| 119 West Northamptonshire                     | 4.2   | 14.7  | 41.2   | 36.5  | 3.4    | 66.4   | 33.6  | 37.6                  |
| 156 Northampton (town) ...                    | 3.2   | 9.6   | 42.6   | 38.5  | 6.1    | 67.9   | 32.1  | 38.3                  |
| 66 Oxfordshire Militia ...                    | 3.0   | 16.7  | 57.6   | 22.7  | 0      | 64.4   | 35.6  | 29.2                  |
| 112 Dunstable, Beds ...                       | 3.1   | 15.2  | 35.7   | 41.5  | 4.5    | 63.8   | 36.2  | 41.1                  |
| 60 Dover boatmen ...                          | 3.3   | 18.3  | 52.5   | 24.2  | 1.7    | 82.5   | 17.5  | 21.7                  |
| 167 Horsham market ...                        | 3.6   | 15.6  | 46.1   | 30.2  | 4.5    | 71.9   | 28.1  | 31.4                  |
| 70 Chichester (city)...                       | 4.3   | 20.0  | 46.4   | 25.0  | 4.3    | 57.1   | 42.9  | 36.1                  |
| 79 Chichester farmers ...                     | 7.0   | 24.0  | 39.2   | 27.2  | 2.5    | 66.0   | 34.0  | 31.8                  |
| 66 Chichester (country) ...                   | 2.3   | 28.0  | 38.6   | 28.0  | 3.0    | 64.4   | 35.6  | 33.3                  |
| 193 Southampton ...                           | 3.9   | 22.3  | 47.2   | 24.6  | 2.1    | 70.2   | 29.8  | 28.2                  |
| 100 Devizes (town) ...                        | 5.5   | 20.0  | 41.5   | 30.5  | 2.5    | 65.5   | 34.5  | 33.7                  |
| 25 Farnborough ...                            | 0     | 12    | 66     | 22    | 0      | 84     | 16    | 19                    |
| 63 Yeovil ...                                 | 0     | 19.5  | 41.0   | 37.0  | 2.5    | 65     | 35    | 36.3                  |
| 79 North Somerset ...                         | 4.4   | 11.4  | 36.1   | 42.4  | 5.7    | 59.5   | 40.5  | 44.3                  |
| 2000 Bristol (lower classes)                  | 3.6   | 14.65 | 39.45  | 37.0  | 4.95   | 63.2   | 36.8  | 39.4                  |
| 300 Bristol (middle classes)                  | 3.9   | 13.5  | 42.6   | 33.9  | 5.6    | 62.1   | 37.4  | 38.4                  |
| 200 Bristol, Clifton and Bath (upper classes) | 4.7   | 16.2  | 39.4   | 35.7  | 3.9    | 66.5   | 33.5  | 36.5                  |
| 139 Gloucester (city) ...                     | 3.2   | 18.3  | 37.7   | 34.9  | 5.7    | 60.1   | 39.9  | 40.2                  |
| 361 Exeter city ...                           | 2.4   | 11.1  | 31.4   | 48.2  | 7.0    | 65.0   | 35.0  | 45                    |
| 200 Totnes and S. Devon ...                   | 4.25  | 13.0  | 26.0   | 43.5  | 13.25  | 61.75  | 38.25 | 50                    |
| 110 Plymouth ...                              | 4.1   | 16.8  | 45.9   | 29.5  | 3.6    | 72.3   | 27.7  | 30.4                  |
| 300 St. Austell (country) ...                 | 4.3   | 10.5  | 29.2   | 41.7  | 14.3   | 64.7   | 35.3  | 45.6                  |
| 250 Truro (city) ...                          | 5.0   | 14.6  | 26.6   | 43.4  | 10.4   | 63.2   | 36.8  | 45.3                  |
| 81 Truro (country) ...                        | 1.2   | 13.0  | 28.4   | 40.7  | 16.6   | 68.5   | 31.5  | 45.8                  |
| 200 Falmouth ...                              | 5.5   | 12.25 | 30.0   | 37.75 | 14.5   | 65.25  | 34.75 | 43.5                  |
| 200 Redruth ...                               | 4.0   | 5.5   | 29.5   | 43.0  | 18.0   | 59.25  | 40.75 | 51                    |
| 125 Penzance ...                              | 3.2   | 10.8  | 24.8   | 40.8  | 20.4   | 55.2   | 44.8  | 53                    |
| 65 Newlyn ...                                 | 4.6   | 12.3  | 28.5   | 43.8  | 10.8   | 59.2   | 40.8  | 41.75                 |
| 50 Dingwall ...                               | 4     | 20    | 33     | 36    | 7      | 83     | 17    | 30                    |
| 200 Forteviot ...                             | 8.75  | 19    | 32.5   | 34.25 | 5.5    | 67.5   | 32.5  | 36                    |
| 50 Comrie ...                                 | 8     | 18    | 33     | 30    | 11     | 77     | 23    | 32                    |
| 99 Bredalbane ...                             | 5.5   | 14.5  | 32.0   | 40.0  | 7.0    | 76     | 23    | 35.5                  |
| 110 Athol ...                                 | 8.6   | 20.9  | 31.8   | 35.0  | 3.6    | 76.8   | 23.2  | 30.9                  |
| 60 Glencoe ...                                | 5.8   | 17.5  | 31.7   | 39.2  | 5.8    | 73.3   | 26.7  | 35.8                  |
| 100 Stranraer ...                             | 4.5   | 11.5  | 30.0   | 46.0  | 8.0    | 68     | 32    | 43                    |
| 300 Midlothian farmers ...                    | 6.6   | 27.7  | 38.9   | 25.0  | 1.6    | 80     | 20    | 23.3                  |
| 30 Eyemouth, fishers of known descent ...     | 5.0   | 26.7  | 43.3   | 25.0  | 0      | 86.7   | 13.3  | 19.2                  |
| 95 Eyemouth fishers ...                       | 7.4   | 22.6  | 47.4   | 20.5  | 2.1    | 74.7   | 25.3  | 24                    |
| 100 Eyemouth landmen ...                      | 6.0   | 27.0  | 35.5   | 27.5  | 4.0    | 72.5   | 27.5  | 29.5                  |
| 90 Dunse ...                                  | 7.2   | 31.1  | 42.8   | 17.2  | 1.7    | 77.8   | 22.2  | 20.5                  |
| 109 Selkirk ...                               | 6.4   | 26.1  | 36.7   | 28.0  | 2.8    | 74.3   | 25.7  | 28.3                  |
| 100 Hawick ...                                | 6.0   | 19.0  | 41.5   | 30.5  | 3.0    | 73     | 27    | 30.3                  |
| 50 Abergavenny (town) ...                     | 4.0   | 9.0   | 32.0   | 45.0  | 10.0   | 51     | 49    | 52                    |
| 110 Abergavenny (country)                     | 4.5   | 12.3  | 34.5   | 37.7  | 10.9   | 71.4   | 28.6  | 38.6                  |
| 50 Brecon (town) ...                          | 6.0   | 12.0  | 22.0   | 54.0  | 6.0    | 65     | 35    | 47.5                  |
| 93 Merthyr and Taff Vale ...                  | 2.7   | 11.3  | 43.0   | 36.6  | 6.4    | 60.2   | 39.8  | 41.4                  |
| 375 Caermarthen Eisteddfod                    | 7.6   | 8.0   | 21.6   | 44.0  | 18.7   | 53.9   | 46.1  | 54.4                  |



These results will be appreciated best if they are put into the form of a chart (Figs. 3 and 4). Here the dotted line indicates the percentage of dark hair and the continuous the percentage of dark eyes. It will be noticed that the first twenty

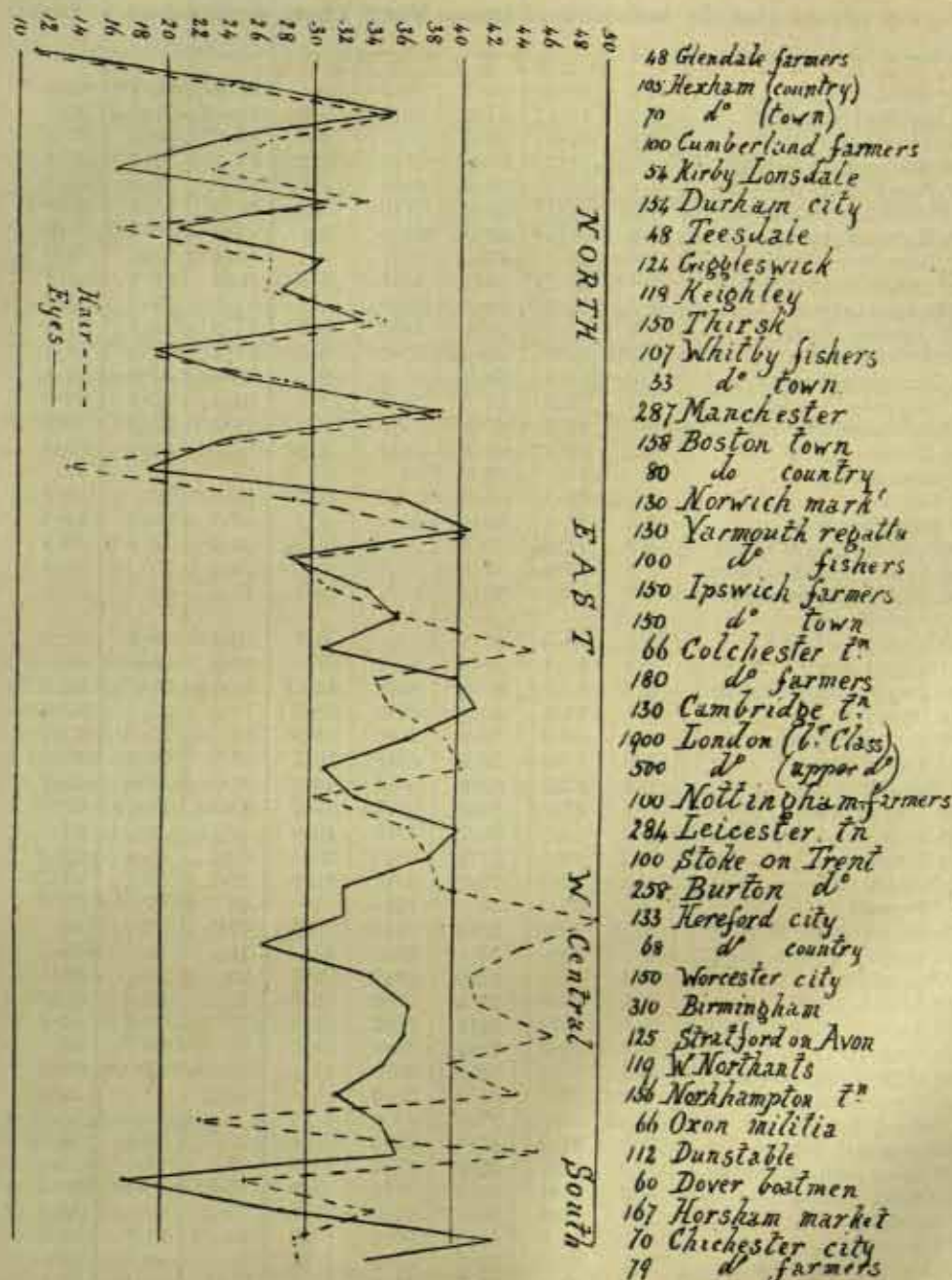


FIG. 3.—COLOUR INDEX OF ENGLAND.

observations, relating to the northern and eastern counties, show a most striking correspondence in the two lines, a correspondence which occurs again in Sussex and

Hampshire, while in Hereford, Worcester, Cornwall, the Highlands of Scotland, and Wales there is much more discrepancy between them. Ripley has pointed out that in Germany the evidence derived from the hair is not corroborated by that from the eyes, but I think that the method of estimation which I have suggested shows that

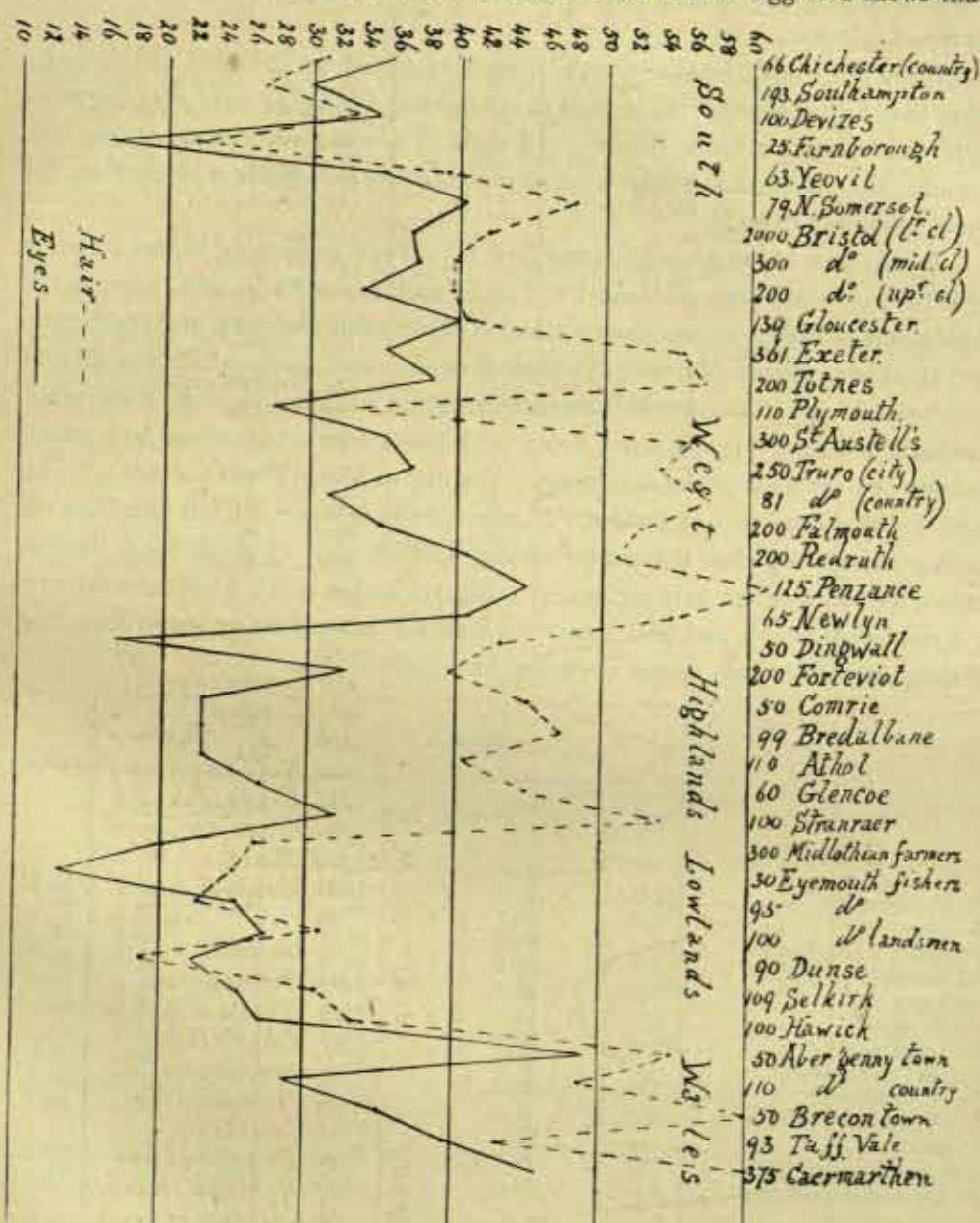


FIG. 4.—COLOUR INDEX OF GREAT BRITAIN (continued from fig. 3).

in the British Isles there is a close harmony between them, much too close to be merely fortuitous, in that part of the country in which the Nordic element is purest; while the parts in which we have every reason to believe that this element is less pure show



a marked discrepancy between the hair and eye indices. It is interesting to note that the eye colour is a much less sensitive index than is that of the hair, and it must be borne in mind that many of the unsupported wanderings of the latter, such as that of the 66 Oxfordshire Militia, may be due to the index being based on an insufficient supply of material.

It is not my intention, however, to draw deductions from the chart, at this stage, other than to test whether my method of interpreting Beddow's results is an improvement on existing methods. Personally I think it is, when everything is taken into account, and no doubt the chart method of expressing the results is better than the mere numerical index.

It will now be worth considering how far we can harmonize Beddow's results with those of other observers, and I will take first those of Fleure and James on the inhabitants of Wales, because their method of observation was much more deliberate, and therefore, presumably, more accurate than the rapid glance which was all that Beddow could give. It must also be remembered that while Beddow took all who came, townfolk or country people alike, Fleure and James rejected all whose four grandparents had not lived in the same place. The way in which Fleure has tabulated his results differs from that of Beddow. I am unable to separate the fair hair from the brown, though this does not matter as long as their ideas of the division between brown and dark-brown hair correspond. Nor am I able to tell what coloured eyes the red-haired people had, and I have been obliged to work on my experience that three-quarters of these people elsewhere have light eyes.

|                                  | Hair. |       |        |       |        | Eyes.  |       | Index. |
|----------------------------------|-------|-------|--------|-------|--------|--------|-------|--------|
|                                  | Red.  | Fair. | Brown. | Dark. | Black. | Light. | Dark. |        |
| 27 Plynlymmon ...                | 22.2  | 25.9  | 51.8   | 46.3  | 53.7   | 52.75  |       |        |
| 55 Llandyssul ...                | 7.3   | 14.5  | 78.2   | 23.6  | 76.4   | 77.3   |       |        |
| 84 S.E. Caermarthen ...          | 13.1  | 25.0  | 61.9   | 57.1  | 42.9   | 52.4   |       |        |
| 32 Newcastle Emlyn ...           | 3.1   | 46.9  | 50.0   | 62.5  | 37.5   | 43.75  |       |        |
| 53 Towy Valley ...               | 7.5   | 28.3  | 64.2   | 58.5  | 41.5   | 52.8   |       |        |
| 18 Newquay ...                   | 0     | 11.1  | 88.8   | 22.2  | 77.7   | 83.25  |       |        |
| 54 Tregaron ...                  | 26.4  | 20.6  | 52.9   | 58.8  | 41.2   | 47     |       |        |
| 100 W. Montgomery ...            | 8     | 25    | 67     | 56    | 44     | 55.5   |       |        |
| 18 N. Montgomery ...             | 11.1  | 22.2  | 66.6   | 47.2  | 52.8   | 59.7   |       |        |
| 138 Great Cleft, Merioneth, etc. | 3.6   | 22.5  | 73.9   | 60.8  | 39.1   | 56.5   |       |        |
| 113 Ardudwy ...                  | 3.5   | 16.8  | 79.6   | 46.0  | 54.0   | 66.8   |       |        |
| 51 Denbighshire Upland ...       | 2     | 11.7  | 86.3   | 35.3  | 64.7   | 75.5   |       |        |

The accompanying chart (Fig. 5) when compared with Fig. 4, shows that Beddow and Fleure only once worked in the same neighbourhood, Beddow at the Caermarthen Eisteddfod and Fleure in South-east Caermarthenshire, and their results are wonderfully alike. Beddow gets an index, when estimated by my method, of 54.4

(hair 62.7, eyes 46.1), and Fleure an index of 52.4 (hair 61.9, eyes 42.9), so that in all probability their methods of estimating hair and eye colour are substantially the same.

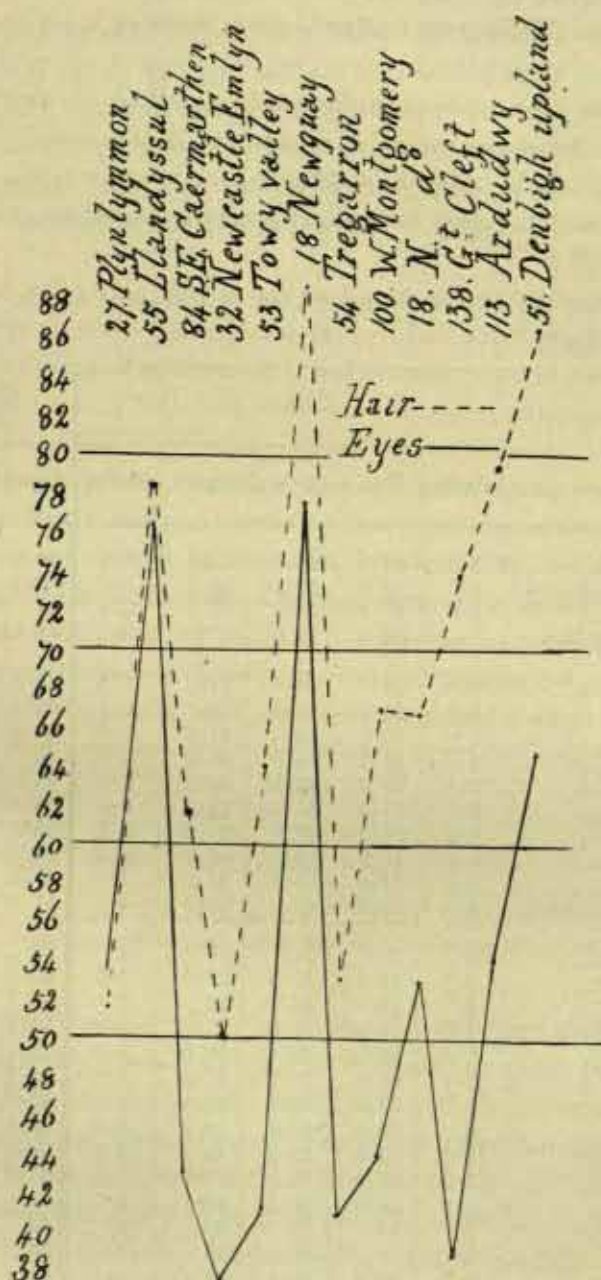


FIG. 5.

The chart shows that, when the ground is quartered in the careful way that Fleure and James have done, and care taken to exclude alien visitors and late settlers, pockets of inhabitants of very high nigrescence indeed are found, and that even dark



eyes may reach a percentage of over 75 per cent. This is the kind of work which needs doing elsewhere in the British Isles, and the object of this paper is to prepare the ground for work of the kind.

Another series of observations which it is possible to bring into line with those already recorded are those published in the *Hue and Cry* in the middle of the last century, giving the hair and eye colours of deserters from the Army. Beddoe was satisfied that the descriptions were accurately observed by the military surgeons and, although my own experience of present-day conditions makes me rather less confident, I feel that this mass of material should not be rejected without careful examination.

In the following list I have arranged them in the same way in which Beddoe's results were arranged.

|  | Hair. |       |        |       |        | Eyes.  |       | Index. |
|--|-------|-------|--------|-------|--------|--------|-------|--------|
|  | Red.  | Fair. | Brown. | Dark. | Black. | Light. | Dark. |        |
| 150 Northumberland ...                     | 5.3   | 18.7  | 48.0   | 27.3  | .7     | 66.7   | 33.3  | 30.6   |
| 150 Newcastle and Gateshead                | 4.0   | 24.6  | 38     | 29.3  | 4.0    | 66.7   | 33.3  | 33.3   |
| 200 Durham ...                             | 4.0   | 24.5  | 43.5   | 24.5  | 3.5    | 71     | 29    | 28.5   |
| 200 Cumberland and West-<br>moreland.      | 7.5   | 33.5  | 28.0   | 27.5  | 3.5    | 71     | 29    | 30     |
| 150 N. and E. Riding... ..                 | 10.0  | 22.6  | 48.6   | 17.3  | 1.3    | 68.6   | 31.3  | 25.9   |
| 600 W. Riding ... ..                       | 3.8   | 24.5  | 42.0   | 25.8  | 3.8    | 60.5   | 39.5  | 34     |
| 800 Lancashire ... ..                      | 4.0   | 22.0  | 44.6   | 24.4  | 5.0    | 63.5   | 36.5  | 32.9   |
| 150 Lincolnshire ... ..                    | 4.6   | 26.7  | 44.6   | 21.3  | 2.7    | 66     | 34    | 29     |
| 200 Notts ... ..                           | 2.5   | 29.0  | 43.0   | 20.5  | 5.0    | 64.5   | 35.5  | 30.5   |
| 200 Staffs ... ..                          | 3.5   | 21.5  | 47.5   | 23.0  | 4.5    | 58.5   | 41.5  | 34.5   |
| 167 Derbyshire ... ..                      | 4.8   | 24.5  | 47.3   | 21.0  | 2.4    | 66.5   | 33.5  | 28.5   |
| 80 Leicester ... ..                        | 8.7   | 15.0  | 50.0   | 20.0  | 6.3    | 60     | 40    | 33.2   |
| 125 Oxfordshire ... ..                     | 0.8   | 32.8  | 36.8   | 27.2  | 2.4    | 63.6   | 38.4  | 34     |
| 150 Northants, Rutland,<br>Beds and Hunts. | 1.3   | 25.3  | 40.0   | 29.3  | 4.0    | 57.3   | 42.6  | 37.9   |
| 100 Warwickshire ... ..                    | 8     | 23    | 34     | 33    | 2      | 53     | 47    | 41     |
| 200 Birmingham ... ..                      | 3.5   | 18.5  | 47.5   | 27.5  | 3.0    | 60.5   | 39.5  | 35     |
| 100 Worcestershire ... ..                  | 3     | 25    | 43     | 22    | 7      | 64     | 36    | 32.5   |
| 200 Bucks and Herts ... ..                 | 1.0   | 16.5  | 51.0   | 28.5  | 3.0    | 56.5   | 43.5  | 37.5   |
| 40 Cambridge ... ..                        | 2.5   | 20.0  | 52.5   | 20.0  | 5.0    | 72.5   | 27.5  | 26.3   |
| 250 E. Anglia ... ..                       | 3.2   | 28.8  | 39.2   | 27.2  | 1.6    | 55.2   | 44.8  | 36.8   |
| 200 Essex ... ..                           | 3.5   | 23.0  | 44.5   | 27.0  | 2      | 55.5   | 44.5  | 36.7   |
| 67 Middlesex ... ..                        | 0     | 20.9  | 62.7   | 10.5  | 5.9    | 64.2   | 35.8  | 26.1   |
| 1250 London ... ..                         | 2.8   | 18.6  | 52.2   | 23.2  | 3.1    | 59.6   | 40.4  | 33.3   |
| 350 Kent ... ..                            | 2.9   | 27.4  | 40.3   | 26.0  | 3.2    | 60.8   | 39.2  | 34.6   |
| 150 Surrey ... ..                          | 5.3   | 24.0  | 41.3   | 24.7  | 4.7    | 64     | 36    | 32.7   |
| 200 Sussex ... ..                          | 3     | 30    | 33     | 32    | 2      | 58     | 42    | 38     |
| 50 Brighton ... ..                         | 2     | 18    | 58     | 16    | 6      | 64     | 36    | 29     |
| 175 Berks ... ..                           | 3.4   | 26.9  | 40.6   | 24    | 5.1    | 61.1   | 38.9  | 34     |
| 200 Hants ... ..                           | 3.5   | 27.0  | 43.0   | 21.0  | 5.5    | 61     | 39    | 32.7   |
| 75 Portsmouth ... ..                       | 0     | 29.3  | 42.7   | 21.3  | 6.6    | 56     | 44    | 35.9   |
| 100 Wilts ... ..                           | 3.0   | 26    | 37     | 31    | 3      | 46     | 54    | 44     |
| 80 Dorset ... ..                           | 1.25  | 25.0  | 41.25  | 27.5  | 5.0    | 46.2   | 53.7  | 43.1   |
| 250 Devon ... ..                           | 3.2   | 25.6  | 38.4   | 26.0  | 6.8    | 61.2   | 38.8  | 35.8   |
| 150 Cornwall ... ..                        | .6    | 20.0  | 43.3   | 29.3  | 6.6    | 53.3   | 46.6  | 41.3   |



|                             | Hair. |       |        |       |        | Eyes.  |       | Index. |
|-----------------------------|-------|-------|--------|-------|--------|--------|-------|--------|
|                             | Red.  | Fair. | Brown. | Dark. | Black. | Light. | Dark. |        |
| 200 Somerset ... ..         | 3.0   | 18.0  | 55.0   | 21.5  | 2.5    | 70.0   | 30.0  | 27     |
| 100 Bristol ... ..          | 1     | 18    | 51     | 27    | 3      | 64     | 34    | 32     |
| 150 Gloucester ... ..       | 2.7   | 19.3  | 47.3   | 27.3  | 3.3    | 58     | 42    | 36.3   |
| 67 Inverness... ..          | 4.4   | 26.9  | 22.4   | 40.3  | 5.9    | 76.1   | 23.8  | 35     |
| 70 Ross ... ..              | 4.3   | 37.1  | 24.3   | 31.4  | 2.8    | 72.8   | 27.1  | 30.7   |
| 67 Sutherland and Caithness | 4.4   | 29.8  | 38.8   | 23.9  | 3.0    | 76.1   | 23.8  | 25.4   |
| 75 Hebrides ... ..          | 2.7   | 37.3  | 28.0   | 24.0  | 8.0    | 80.0   | 20.0  | 26     |
| 100 Belfast ... ..          | 6     | 17    | 38     | 29    | 10     | 68     | 32    | 35.5   |
| 75 Donegal ... ..           | 2.7   | 22.7  | 37.3   | 25.3  | 12.0   | 69.3   | 30.6  | 33.9   |
| 500 Rest of Ulster ... ..   | 3.6   | 24.2  | 36.6   | 28.2  | 7.4    | 73.4   | 26.6  | 31.1   |
| 200 Dublin ... ..           | 4     | 19    | 46     | 24    | 7      | 68     | 32    | 31.5   |
| 125 Meath ... ..            | 6.4   | 20.0  | 36.0   | 30.4  | 7.2    | 68.8   | 31.2  | 34.4   |
| 400 Rest of Leinster ... .. | 5.2   | 21.5  | 38.5   | 27.5  | 7.5    | 69.7   | 30.2  | 32.6   |

On comparing the chart (Fig 6) of these military statistics with that of Beddoe (Fig. 3 and 4) and Fleure (Fig. 5), it is evident that either the standards of the observers differ or that soldiers' hair is lighter than that of civilians, for in the former the eyes are almost always darker than the hair, while in the latter the reverse is the case. This, obviously, needs checking, but until that can be done I do not feel inclined to place very much confidence on these military records. Still, I give them for what they are worth, and it will be noticed that where the localities are the same the discrepancy is not very great, as the following three towns show :—

|                   | Beddoe.                           | Military.                         |
|-------------------|-----------------------------------|-----------------------------------|
| London ... ..     | Index 38.3 (hair 39.7, eyes 36.9) | Index 33.3 (hair 26.3, eyes 40.4) |
| Birmingham ... .. | Index 39.7 (hair 42.1, eyes 37.3) | Index 35.0 (hair 30.5, eyes 39.5) |
| Bristol ... ..    | Index 39.4 (hair 42.0, eyes 36.8) | Index 32.0 (hair 30.0, eyes 34.0) |

In the accompanying map of the British Isles (Fig. 7), I have plotted out Beddoe's, Fleure's, and the military statistics reduced to common indices, those of the towns enclosed in circles to distinguish them from the country inhabitants. The military statistics are underlined, while those of Fleure and James are doubly underlined. As far as Great Britain is concerned the indices are based upon males alone, but in Ireland there were so few of these that I have had to fall back upon the records which Beddoe has left us of observations in which the sexes were mixed; because, unfortunately, he did not separate the sexes in Ireland as he so often did elsewhere. It will be necessary, therefore, to remember that these Irish observations are probably a little higher than those in England and Scotland, depending on the varying proportion of females included in his lists. The map should be checked with the charts, which give the relative values of hair and eye darkness, because the difference between



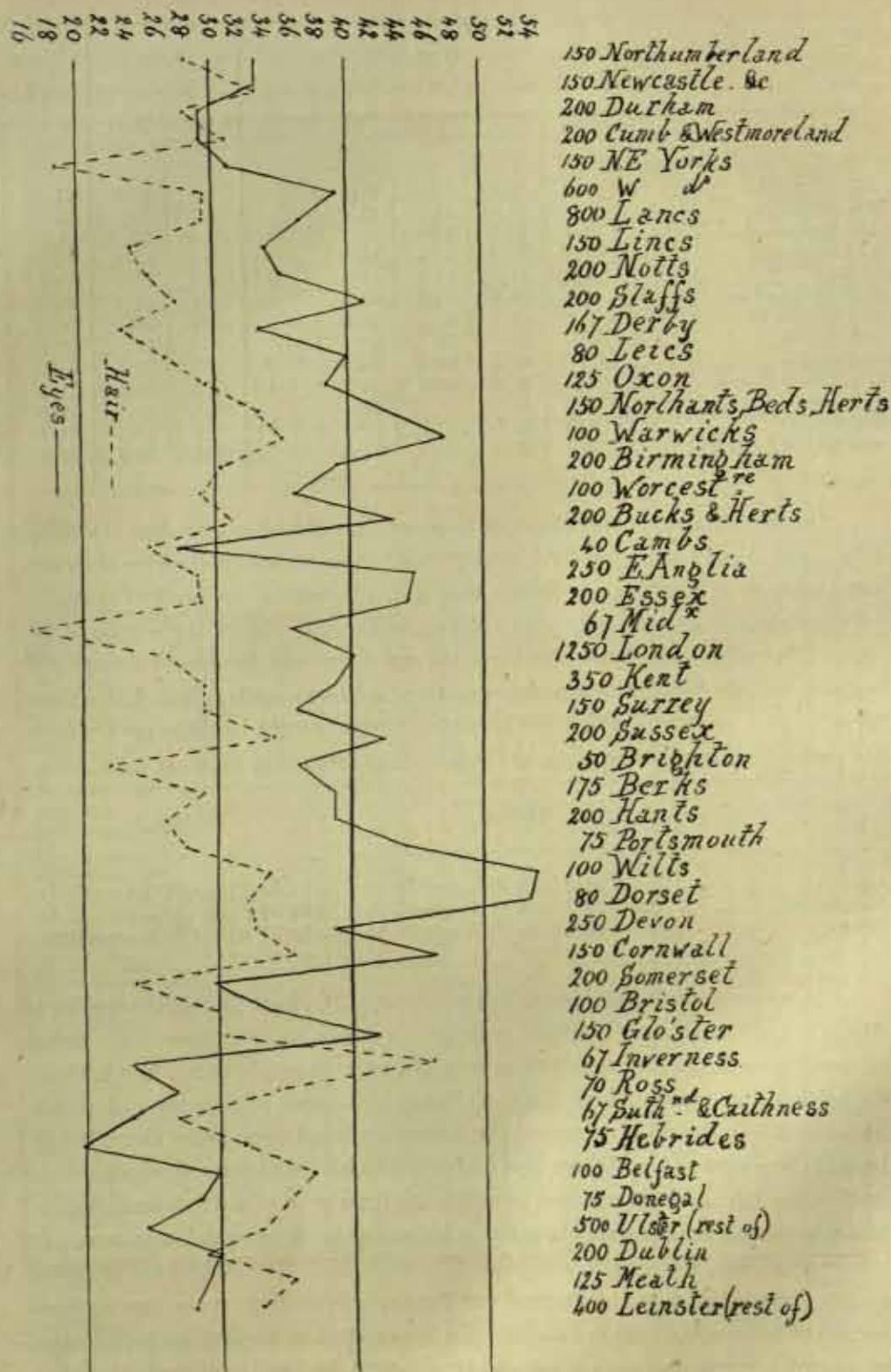


FIG. 6.—COLOUR INDEX OF BRITISH ISLES (MILITARY STATISTICS).

these is often a characteristic local feature. For instance, in the north and east of England the indices of the hair and eyes are almost always very close, and I cannot help regarding this as an indication of preponderance of a pure Nordic strain, while

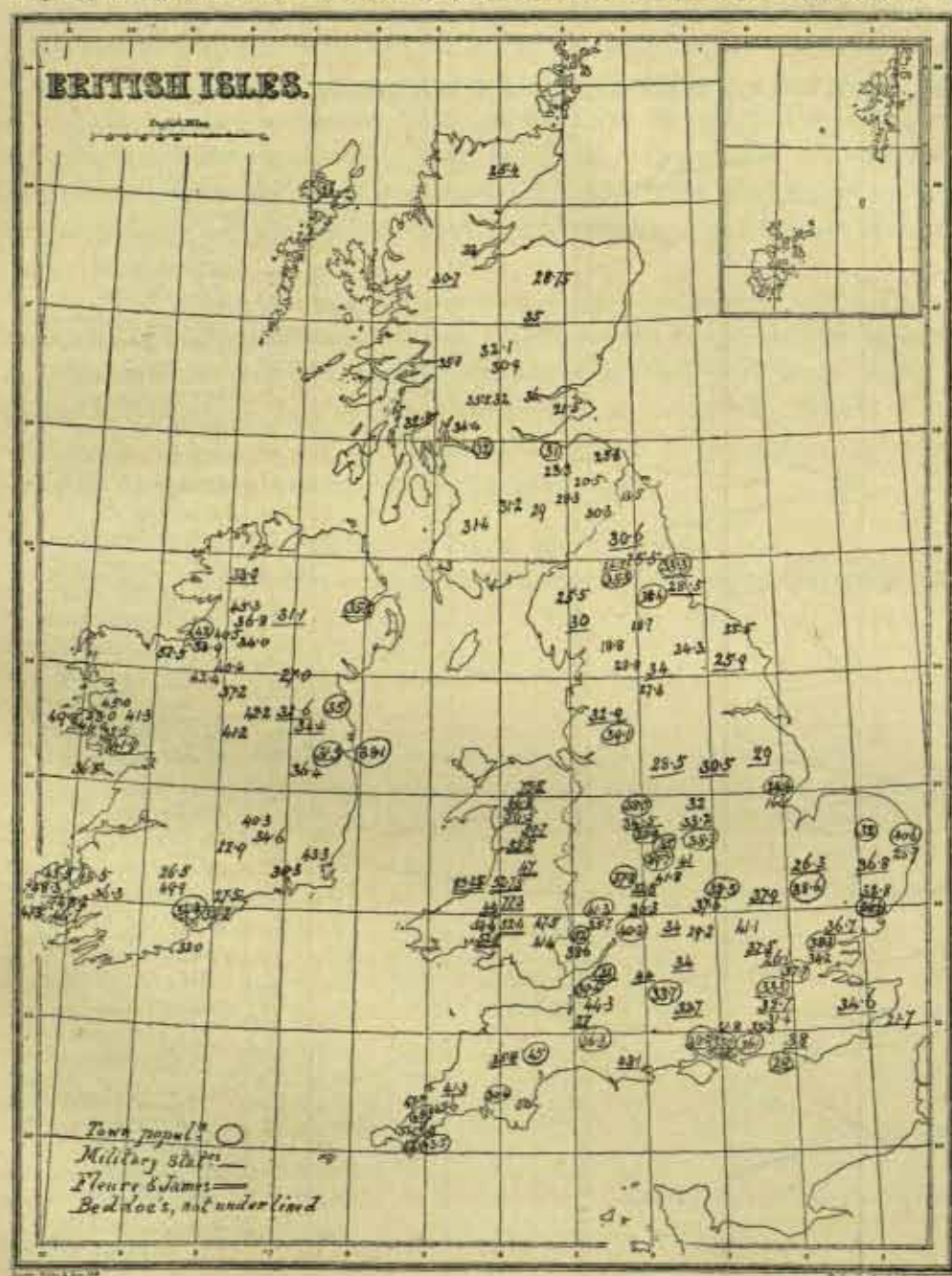


FIG. 7.—COLOUR INDICES OF THE UNITED KINGDOM.

in the West Country, Wales, the Scottish Highlands and Ireland the high index is usually due to very dark hair accompanying light eyes. It will be seen that 50. per



cent. of dark eyes is very rarely reached except in Wales, while dark hair may go above 70 per cent. in Wales and the south of Ireland.

When the index of both hair and eyes is high we may safely infer a large preponderance of Mediterranean blood from early or later settlements, but when the one

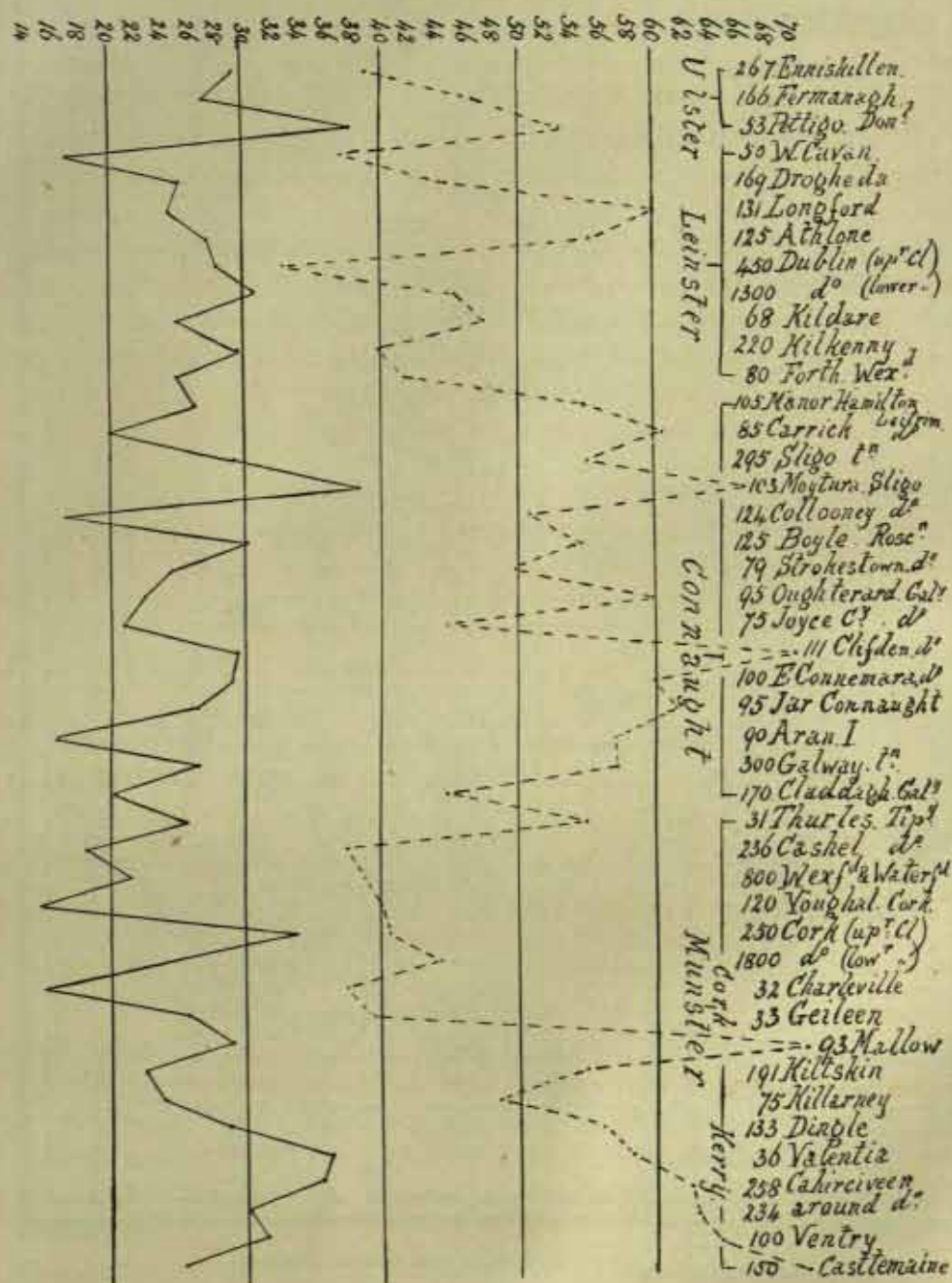


FIG. 8.—COLOUR INDEX OF IRELAND (MALES AND FEMALES).

contradicts the other there is probably a large contribution of both Nordic and Mediterranean stocks, and it is interesting to notice how the Nordic eyes and the Mediterranean hair seem the dominant elements in the mixture.

The chart of the Irish indices (Fig. 8) is given here, apart from the others, because I wish to impress once more the fact that it is not quite comparable with them owing to the observations being made on men and women instead of on men alone. In spite of this I would like Professor Keith, and those who believe with him that there are no physical differences which would enable an anthropologist to distinguish a representative group of people from the east of England from one from the west of Ireland, to notice the light hair and eyes of the east contrasting with the dark hair and light eyes of the west.

The work which Beddoe and Fleure have done, when brought to a common standard and analyzed carefully, will not, I think, support Prof. Keith's theory that the Mediterranean stock is not largely represented in many parts of our islands; neither will it support Madison Grant's theory that the modern Englishman is an equal mixture of Nordic and Mediterranean elements, or 50 per cent. of dark eyes would be a common occurrence instead of a great rarity.

#### COLORATION IN TOWN AND COUNTRY.

In going through Beddoe's records I have been struck by the fact that the people in the towns seem darker than those in the neighbouring country and, in order to follow this up, contrast the two sets of records:—

|                               | Town. |       |        | Country. |       |        |                                    |
|-------------------------------|-------|-------|--------|----------|-------|--------|------------------------------------|
|                               | Hair. | Eyes. | Index. | Hair.    | Eyes. | Index. |                                    |
| Hexham ... ..                 | 35.7  | 35.0  | 35.3   | 24.3     | 24.7  | 24.5   | Northumberland (military records). |
| Newcastle (military records)  | 33.3  | 33.3  | 33.3   | 28       | 33.3  | 30.6   |                                    |
| Durham (city) ... ..          | 33.8  | 31.0  | 32.4   | 16.6     | 20.8  | 18.7   |                                    |
| Boston ... ..                 | 24.4  | 24.4  | 24.4   | 13.8     | 19.4  | 16.6   | Teesdale.                          |
| Hereford ... ..               | 50.0  | 32.7  | 41.3   | 44.1     | 27.2  | 35.7   | Worcestershire (military records). |
| Birmingham (military records) | 30.1  | 39.5  | 35.0   | 35.0     | 47.0  | 41.0   |                                    |
| Northampton ... ..            | 44.6  | 32.1  | 38.3   | 39.9     | 33.6  | 37.6   |                                    |
| Ipswich ... ..                | 36.3  | 36.0  | 36.1   | 31.6     | 34.0  | 32.8   | W. of county.                      |
| Colchester ... ..             | 45.5  | 31.0  | 38.6   | 34.4     | 33.9  | 34.2   | Farmers.                           |
| London (military records)     | 26.3  | 40.4  | 33.3   | 16.4     | 35.8  | 26.1   | Farmers.                           |
| Chichester ... ..             | 29.3  | 42.9  | 36.1   | 31.0     | 35.6  | 33.3   | Middlesex (military records).      |
| Portsmouth (military records) | 27.9  | 44    | 35.9   | 26.5     | 39    | 32.7   | Hants (military records).          |
| Exeter ... ..                 | 55.2  | 35.0  | 45     | 56.75    | 38.2  | 50     | S. Devon.                          |
| Truro ... ..                  | 53.8  | 36.8  | 45.3   | 57.3     | 31.5  | 45.8   |                                    |
| Bristol ... ..                | 43.5  | 38.7  | 41.1   | 48.1     | 40.5  | 44.3   | N. Somerset.                       |
| Bristol (military records)    | 30.0  | 34.0  | 32.0   | 26.8     | 35.2  | 31.0   | Somerset and Gloucestershire.      |



When these are charted (see Fig. 9), it is evident that in by far the greater number of cases the townspeople are darker than the surrounding country folk, though, in the West Country, where the nigrescence of the country folk is very high, the townspeople are fairer. It is unfortunate that more material for comparison is not at present available, but I expect that the towns, with their more fluent populations, tend towards the average index of the whole country; though I do not think that this

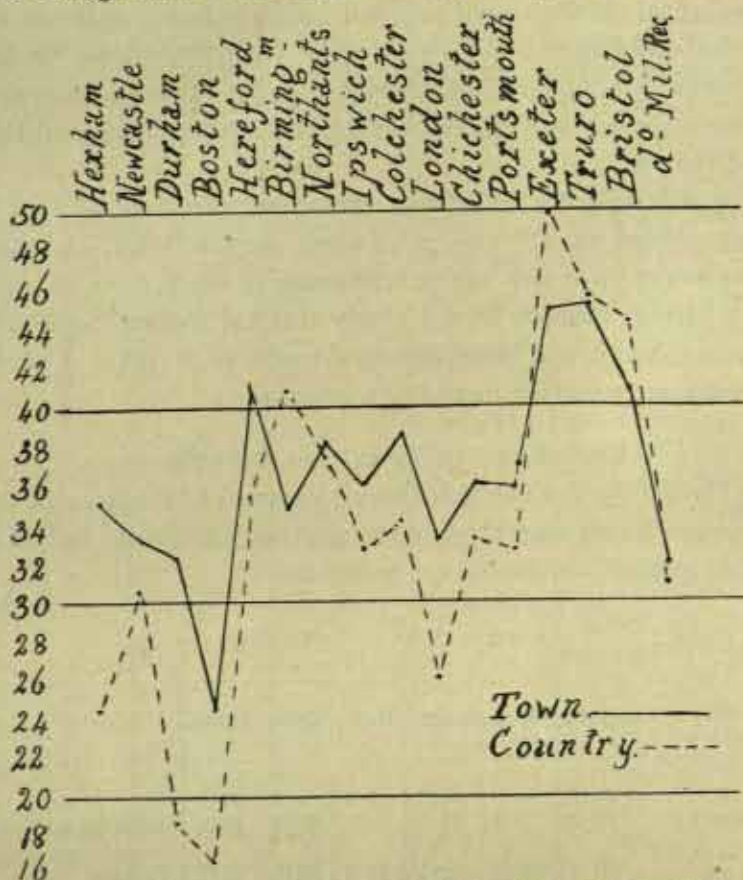


FIG. 9.—COMPARISON OF COLOUR INDEX IN TOWN AND COUNTRY.

accounts for all the difference, and I believe that there is a tendency for fair people to preponderate away from large towns; possibly because they do not resist the influences of crowded surroundings so well as the dark. At all events the result of this comparison impresses on me the necessity of avoiding urban observations if we wish to use our results in tracing the distribution of racial strains throughout the country.

#### ON THE DISTRIBUTION OF RED HAIR.

In the foregoing tables the distribution of red hair in males, according to Beddoe's observations, is recorded, but, unless there is a marked sexual difference in its presence, a great deal more of his material will be available, and it therefore becomes important

to contrast its frequency in those cases in which the sexes have been recorded separately. The following list will make this clear:—

|                             | ♂<br>Per cent. | ♀<br>Per cent. |                                | ♂<br>Per cent. | ♀<br>Per cent. |
|-----------------------------|----------------|----------------|--------------------------------|----------------|----------------|
| Glendale ...                | 7.3 (48)       | 5.1 (39)       | Gloucester (city) ...          | 3.2 (139)      | 4.8 (134)      |
| Hexham (country) ...        | 7.6 (105)      | 5.0 (20)       | Yeovil ...                     | 0 (63)         | 0 (80)         |
| Hexham (town) ...           | 4.3 (70)       | 4.3 (70)       | N. Somerset ...                | 4.4 (79)       | 3.7 (54)       |
| Durham (city) ...           | 6.8 (154)      | 6.8 (96)       | Bristol (lower class) ...      | 3.6 (2000)     | 4.0 (2000)     |
| Teesdale ...                | 6.2 (48)       | 0 (24)         | Bristol (middle class) ...     | 3.9 (300)      | 2.8 (300)      |
| Giggleswick ...             | 5.6 (124)      | 3.3 (61)       | Bristol (upper class) ...      | 4.7 (200)      | 4.5 (400)      |
| Keighley ...                | 9.7 (118)      | 6.8 (81)       | Exeter (city) ...              | 2.4 (361)      | 3.1 (439)      |
| Thirsk ...                  | 8.7 (150)      | 5.5 (110)      | Totnes ...                     | 4.25 (200)     | 2.8 (160)      |
| Whitby ...                  | 5.7 (140)      | 1.9 (105)      | Plymouth ...                   | 4.1 (110)      | 4.3 (70)       |
| Manchester ...              | 6.0 (289)      | 6.2 (186)      | St. Austell ...                | 4.3 (300)      | 4.4 (550)      |
| <i>Average of North</i> ... | 6.8 (1246)     | 4.5 (791)      | Truro (city) ...               | 5.0 (250)      | 4.0 (250)      |
| Boston (town) ...           | 3.2 (158)      | 8.5 (182)      | Truro (country) ...            | 1.2 (81)       | 3.8 (142)      |
| Boston (country) ...        | 5.0 (80)       | 4.0 (50)       | Falmouth ...                   | 5.5 (200)      | 4.7 (150)      |
| Norwich market ...          | 6.2 (130)      | 5.6 (160)      | Redruth ...                    | 4.0 (200)      | 4.0 (200)      |
| Yarmouth regatta ...        | 3.4 (175)      | 3.5 (275)      | Penzance ...                   | 3.2 (125)      | 2.1 (125)      |
| Ipswich (town) ...          | 1.3 (150)      | 4.0 (100)      | Newlyn ...                     | 4.6 (65)       | 6.9 (79)       |
| Colchester (town) ...       | 5.3 (66)       | 2.1 (47)       | <i>Average of West</i>         |                |                |
| Colchester (country) ...    | 4.7 (180)      | 3.3 (30)       | <i>Country</i> ...             | 3.7 (5024)     | 4.0 (5575)     |
| Cambridge (town) ...        | 1.2 (130)      | 0 (70)         | Forteviot ...                  | 8.75 (200)     | 6.5 (100)      |
| <i>Average of East...</i>   | 3.8 (1069)     | 3.9 (914)      | Comrie ...                     | 8.0 (50)       | 5.0 (50)       |
| London (lower class) ...    | 4.0 (1900)     | 4.5 (3500)     | Bredalbane ...                 | 5.5 (99)       | 7.0 (64)       |
| London (upper class) ...    | 4.8 (500)      | 5.5 (323)      | Athol ...                      | 8.6 (110)      | 8.0 (51)       |
| Leicester (town) ...        | 4.2 (284)      | 4.3 (256)      | Glencoe ...                    | 5.8 (60)       | 5.5 (64)       |
| Stoke-on-Trent ...          | 2.0 (100)      | 3.5 (100)      | Stranraer ...                  | 4.5 (100)      | 6.0 (50)       |
| Burton-on-Trent ...         | 3.3 (258)      | 3.9 (102)      | Eyemouth ...                   | 6.0 (100)      | 5.0 (100)      |
| Birmingham ...              | 3.2 (310)      | 6.2 (357)      | Dunse ...                      | 7.2 (90)       | 2.7 (70)       |
| Stratford-on-Avon ...       | 3.6 (125)      | 3.4 (175)      | Selkirk ...                    | 6.4 (109)      | 7.6 (91)       |
| W. Northants ...            | 4.2 (119)      | 4.9 (61)       | <i>Average of Scotland</i> ... | 6.75 (918)     | 5.9 (640)      |
| Northampton (town) ...      | 3.2 (156)      | 4.1 (145)      | Abergavenny (town) ...         | 4.0 (50)       | 10.0 (50)      |
| <i>Average of Mid-</i>      |                |                | Abergavenny                    | 4.5 (110)      | 3.9 (90)       |
| <i>lands</i> ...            | 3.4 (1352)     | 4.3 (1196)     | (country)                      |                |                |
| Hereford (city) ...         | 6.4 (133)      | 5.3 (142)      | Brecon ...                     | 6.0 (50)       | 6.0 (50)       |
| Hereford (country) ...      | 2.2 (68)       | 4.7 (150)      | Taff Vale ...                  | 2.7 (93)       | 9.0 (67)       |
| Worcester (city) ...        | 2.0 (150)      | 5.3 (150)      | Caermarthen ...                | 7.6 (375)      | 6.5 (325)      |
|                             |                |                | <i>Average of Wales</i> ...    | 4.9 (678)      | 7.1 (582)      |

These results show that although the percentage is often very different in the two sexes there is no constant predominance of red hair in either.

This is more definitely established when we find that out of the 12,687 males recorded, 562 (4.4 per cent.) had red hair; while out of the 12,511 females, 617 (4.9 per cent.) had the same.

Having settled, as far as twenty-five thousand records allow, that sex does not affect appreciably the occurrence of red hair, it will be possible to use the whole of Beddoe's material, sexed and unsexed, in order to see how it is distributed geographically. I do not propose to give the percentage of each small locality, because it is



often based on less than a hundred observations; and I know from experience that it is only when dealing with thousands that a true percentage can be reached. In the following list the percentage of red hair is given in each large district with the number of observations, in brackets, on which it is based:—

*Scotland.*—The Isles 6.0 (1261), Caithness 6.9 (300), N. Highlands 5.5 (1455), W. Highlands 4.4 (1299), Central Highlands 9.1 (420), Highlands 7.2 (350), Fife 7.6 (1600), E. Lowlands 6.8 (1801), Mid Lowlands 6.9 (1745), Bredalbane 7.3 (199), Galloway 5.1 (1450), Glasgow 8.3 (180), Edinburgh 6.7 (3000), Lothian 5.7 (981), Merse 5.8 (555), Borders 5.5 (1773). *Scottish average*, 6.5 per cent.

*England.*—Northumberland 5.5 (1216), Cumbria 4.9 (1940), Durham 5.2 (460), Lancashire 6.3 (875), Yorks 5.8 (4322), Lincoln 4.1 (2385), Derby 4.6 (140), Notts 4.7 (1100), Leicestershire 4.2 (640), Staffs 3.9 (1792), Salop 4.4 (444), Hereford 4.8 (613), Worcestershire 3.6 (3173), Warwick 4.4 (1020), Northants 3.5 (593), Oxfordshire 5.3 (816), Bucks 7.5 (100), Beds 3.7 (240), Cambridgeshire 1.0 (308), E. Anglia 3.4 (1240), Essex 3.2 (516), London 4.3 (6723), Kent 3.1 (880), Sussex 4.0 (584), Berks 2.1 (260), Hants 4.8 (600), Dorset 2.7 (183), Wilts 2.9 (1609), Somerset 3.0 (711), Gloucestershire 4.5 (869), Bristol 3.8 (6700), Devon 3.5 (2233), Cornwall 4.6 (2717). *English average*, 4.2 per cent.

*Wales.*—S. Wales 5.9 (1826), Mid Wales 5.8 (300), N. Wales 5.8 (906). *Welsh average*, 5.8 per cent.

*Ireland.*—Ulster 4.1 (1161), Leinster 5.1 (3318), Connaught 4.1 (1952), Munster 5.3 (4572). *Irish average*, 4.7 per cent.

The foregoing records show that England has the smallest proportion of red hair and Scotland the largest, while Wales is higher than Ireland in redness.

The two competing theories about red hair at present are: first, that it is a variant of fair hair because it so often accompanies a fair and freckled skin and light eyes; the other that it shows a mixture between a light and a dark race.

Scotland and the north of England are the fairest parts of the kingdom and it is here that red hair is most marked; but it is also well marked in Wales and in parts of Ireland, especially Kerry, where the nigrescence is very high, so that my material seems to help both theories and it may well be that both are true.

Incidentally I should like to call attention to the following class distribution of red hair:—

|            | Upper Classes.       | Lower Classes.        |
|------------|----------------------|-----------------------|
| London ..  | 5.1 per cent. (823). | 4.3 per cent (5400)   |
| Bristol .. | 4.6 per cent. (600). | 3.8 per cent. (4000). |

As far as they go the figures suggest that red hair is more common in the upper than the lower classes, and my own observations during the last year make me believe that not only is red hair commoner but that the upper classes have an altogether lower index of nigrescence than the lower. I cannot, however, in this paper, do more than make this suggestion in order to see whether it accords with the observations of others.

THE ANTHROPOLOGY OF CYPRUS.<sup>1</sup>

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## I.—INTRODUCTION.

## II.—GEOGRAPHY.

## III.—HISTORY.

## IV.—CULTURAL CONDITIONS.

## V.—DEMOGRAPHY.

## VI.—PHYSICAL ANTHROPOLOGY.

## I.—INTRODUCTION.

THE present study is the result of a visit to Cyprus made in the autumn and winter of 1913 under the auspices of the British Association and under the guidance of Professor J. L. Myres; it deals with a part of the ethnological material collected. There remain data on the hair and eye colour of a large number of adults, a series of about 100 adult males, on whom special measurements relating to stature and limb length were taken, and a large series of measurements on children, all of which it is hoped to publish later. The archæological material collected is being published by Professor Myres elsewhere. In carrying out this work the author is extremely indebted to Professor Myres for unlimited help in Cyprus and in England, especially in regard to archæological and general ethnological evidence, and to Professor Arthur Thomson for continued advice and criticism, both destructive and constructive, without which the anthropological work could never have been carried out.

## II.—GEOGRAPHY.

Cyprus is a large island lying in the north-eastern part of the eastern basin of the Mediterranean. It is 60 miles west of Syria and 40 miles south of the mainland of Asia Minor; on the west the nearest land is the islands of Rhodes and Crete.

The area of the island is 3584 square miles, a little greater than the combined area of the counties of Norfolk and Suffolk. Its form was compared by the ancients to a deer's skin, the tail being formed by the long promontory of the Carpass. Structurally it consists of two mountain ranges linked together by a flat plain. The northernmost range forms a great bastion to the whole island, and is the backbone of the Carpass peninsula; it is about 3000 feet high throughout most of its length, and is seldom more than a few miles from the sea.

<sup>1</sup> The cost of publication of the tables in this paper was met in part by a grant from the Royal Society.



The southern range is very much bigger, both in area and in the height of its summits, the highest of which—Mount Troodos—is 6496 feet high. Unlike the northern range it is not uniform in structure, but slowly decreases in height towards the east till it ends in the isolated peak of Sante Croce (2000 feet high) near Larnaka.

These two mountain ranges exercise a predominating influence on the climate of Cyprus. The north winds from the uplands of Anatolia are robbed of much of their moisture by the northern range, but Troodos' summit is sufficiently high to intercept yet further rain; the central plain alone is dry, and being shut off by mountains from the sea, suffers the extremes of heat and cold. Although Cyprus is milder in summer and warmer in winter near the coast of Syria, yet the summer temperature of Nicosia is hotter than that of Cairo, and the snow lies in winter on the summits of Troodos. Different parts of the island have then very different climates. The following meteorological statistics are of interest.

In January the mean temperature of Cyprus is 51.4° F. and in August 81.2° F. The annual rainfall on Troodos is 20–30 inches, on the other mountains 15–20 inches. Nearly all the rain falls in November and December, and practically none in July and August. As a comparison it is interesting to note that the annual rainfall at Larnaka and at Hampstead are nearly the same.

The rivers of Cyprus are never of any great size except when they come down in spate, although some of the streams fed by Troodos are perennial. The springs which flow from the base of the northern mountains also seldom fail. It is to these springs that villages like Lapethos and Karavas owe their richness.

The vegetation is similar in character to that of Syria, apart from a few endemic species. In ancient times it is said that the ships of Egypt were built of timber from Cyprus; at present the supply of timber is scanty. The plants associated with man most closely are olives, locust-beans (*Keratonia*), vines, pomegranates and oranges, and the vegetable *Colocasia*, which latter plays the same part in Cypriot economy as the turnip does in England. The fauna of Cyprus has little of interest to an anthropologist.

Two geographic factors appear to have exercised a predominating influence on the siting of villages—the water supply and the sea. Speaking generally, as there are important exceptions, ancient sites are nearer the sea than the modern villages. The same springs which supplied Bronze Age Lapethos with water, supply the modern village; at Levkoniko, however, changes appear to have taken place, and some of the ancient wells are now dry.

### III.—HISTORY.

From an ethnological point of view the history of Cyprus may be summarized as consisting for the most part of a series of alternating periods in which eastern or Continental and Western or Mediterranean influences have been successively dominant. There is at present little evidence about the Stone Age, although it is



clear that the beginnings of history in Cyprus are anterior to the Bronze Age. The Bronze Age may be divided into three periods. During the early period the material culture is similar with that of the Syrian coast; in the second period the outside influence at work appears to come from the north—that is to say, the coast of Anatolia. Towards the close of the Bronze Age, and probably after the fall of Gnosso, Mediterranean influence appears on the island for the first time, as far as our records go, although the skeletal remains of the people from Early Bronze Age tombs at Lapethos would suggest that there had been Mediterranean influence before, at a very much earlier date.

The Early Iron Age, which may be dated between 1200 B.C. and 550 B.C., may also be divided into three periods. During the first, Continental influence was dominant; during the second (the geometrical period), Mediterranean influence made itself felt; during the third "Orientalising" period Cyprus was strongly under Continental influence. In 569 B.C. the island was conquered by Amasis, King of Egypt.<sup>1</sup> During the thousand years which followed, Cyprus was again subjected alternately to Continental and Mediterranean cultural influences—first Hellenic; secondly Hellenistic, the Continental cultural backwash resulting from the spread of Hellenic culture in the east; and thirdly Græco-Roman, a Western and Mediterranean domination. During the "Dark Ages," which may be said to extend in Cyprus from A.D. 400–1200, the island lived in a condition of ethnic equilibrium as a fief of the Byzantine Empire. The next injection of foreign blood was due to the Third Crusade, at which time Richard Cœur de Lion took over the island. It remained in Frankish hands—English, the Knights Templars, the Crusading family of the Lusignans, and finally Venetian—till 1570, when it was conquered by the Turks. The Turks governed the island till 1878, when the British Government took over the administration. It was not, however, finally annexed by Great Britain until 1914.

It will be noticed how Oriental and Western culture have alternately dominated the island. There appears from early times to have been a similar "Continental" and "Mediterranean" social cleavage within the island itself. Of the kings who paid tribute to Sargon some were Greeks, others Phœnicians; Herodotus makes the same distinction. At the time of the landing of Richard we hear of Greeks and Armenians; to-day we have no longer Greeks and Phœnicians, but Greeks and Turks.

#### IV.—CULTURAL CONDITIONS.

In order accurately to study cultural conditions in Cyprus it would be necessary to remain at least a year in the island. So many occupations are seasonal that one may not be aware of the implements used unless one happens to be in the place at the time that they are actually being employed. The present notice must be

<sup>1</sup> Herod. ii. 182.



taken first and foremost as a preliminary statement of general conditions in Cyprus, the detailed working out of which will be published later, and secondly, as an introduction to the work which was my main object in visiting the island, namely, to study the physique of the present inhabitants. As I have dealt mainly with the Greek element in the population, this chapter will for the most part refer to Greek as opposed to Turkish culture. In the present case my work in physical anthropology was closely associated with archaeological work, and I have ventured to attempt to elaborate certain technological points which have an archaeological interest. Except for a period of work at Lapethos I was working the whole time as Professor Myres' assistant, and although he is in no sense responsible for any opinions I may express, it was owing to his knowledge of the country and his constant assistance and advice that I was able to collect my material.

The social organization of Cyprus, which is the result of a reorganization in British hands of the Turkish system of government, is of little value for our present purpose.

The three principal industries in the part of Cyprus I visited are weaving—a universally-practised domestic occupation—pottery and agriculture. In regard to weaving, the points of importance for our present purpose are, first, the use of the cotton bow. I never saw one, but Professor Myres reports the use of one near Karavas. Such an instrument is decidedly Oriental in character. Secondly, the machine used for spinning is of the same nature. It has a wide dispersal from India westwards, and is present probably as an intrusive element in Japan. Although present in Eastern Europe, it seems entirely foreign to the West, which uses the forms of spinning wheel with which we are all familiar. The frame used for winding the skeins upon is probably also of an Eastern origin. There are two quite distinct forms of warping board. I have unfortunately been unable to trace the history of either of them. The more elaborate form is similar to that in use in Western Europe to-day, but it is not improbably a late introduction into that area.

Thirdly, the looms in general use among the Greeks have a horizontal warp. They may either have a frame at which the weaver sits, or be simply a hole in the ground with a gibbet above to carry the harness. Such a form of loom is in general use over a wide area from Eastern Asia to the west of Africa. Certain interest attaches to the method of tightening the warp, which is carried up to the ceiling from the warp beam and may be either tied to a bit of cord, which is attached behind the weaver's back, or else may be kept tight by a weight. Mr. Ling Roth has shown that similarly weighted looms occur on the coast of Syria. Upright vertical looms which were weighted belong essentially to the Western area of culture. Loom weights which may have been used on such looms have been found in Cyprus, and, it appears, also in Syria, but apparently are absent from or at least of rare occurrence in Egypt. I have, however, seen at the present day in use in Cyprus weights either identical with or similar to the ancient ones used with a



horizontal loom not exclusively to keep the warp taut but rather to effect adjustment close to the treadles. Such loom weights were used both when the warp was tied to a peg and when it was weighted behind the weaver. There seems to be little authority for the distribution of the weighted form of the loom; the form which is tied, is spread from the extreme east of Asia to the West of Africa.

The ancient Greeks do not seem to have known the use of the horizontal loom. Indeed, it is very uncertain whether it was known in Rome till well on into the period of the Empire, and one cannot postulate its general use in Europe till the Middle Ages. In Asia and Africa it seems to have been used from very early times. We cannot exactly date the introduction of the horizontal loom into Cyprus, nor do we know whether the vertical loom was used there apart from the uncertain evidence of loom weights which, as I have shown, are equally applicable to a horizontal loom. I found, however, in certain tombs at Lapethos belonging to the Middle Bronze Age long pins which exactly resemble the pins used at present in the horizontal looms. It is, of course, improbable that this was their use. To-day such pins are used as a crank for the treadles. The evidence we have quoted above will show that if we can further elucidate the history of weaving in the island it may throw an interesting light on cultural problems. It is interesting to note that the crinkly fabrics which appear on antique statues seem to resemble the crinkly fabrics of modern Cyprus. If it could be shown that the resemblance was real and not merely apparent the matter would be interesting, as to weave such a fabric a composite warp is necessary, one warp series being made of cotton the other of silk. There are references in the Old Testament to a prohibition among the Jews as to the use of webs of combined materials (the matter is fully discussed by Dr. Kennedy, *Encyclopædia Biblica*, s.v. Weaving).

Attention may be called to three forms of pots still in general use. First, the women make out of a mixture of mud and the dry chaff of the country a very rude form of pot; these things are coarse and so ungainly as rather to deserve the name of mud pies than pots. They are baked in the sun and used for cooking purposes, and may sometimes be of considerable size when they fulfil the functions of ovens. The second form of pot is plain, rather coarse, red ware, coarse not in relation to the last-named beside which they are graceful. These pots are extremely like the big polished red pots which are so characteristic of the Early Bronze Age in Cyprus. The relation is confirmed by the still surviving breasts which the modern potter daubs on the front of his pot as his predecessor did so long ago. Another type of this pot which is still in common use is the milk bowl, a large pot with a spout that leaves the vessel below the water line and turns upward at a right angle. Additional interest attaches to this form of pot because it is not infrequently stamped with the potter's mark close to the handle, another survival.

Large red jars often 3 feet high are not uncommon in Cypriot villages. They retain the strip of decoration representing a rope which is found on Neolithic pottery.



I had no opportunity of seeing these pots made. There is a folk tale circulating in the villages where they do not at present make such pots, to the effect that there was once a very small potter who was not very popular. They were making one of these big pots, and he got inside and kept turning round and round, smoothing it with his hands. When it was finished, instead of lifting him out they baked pot and potter together.

The other class of pots to which attention may be drawn is commonly known as Famagusta ware; they are made of a clay which bakes white like the Egyptian *gowlah*. They are made on a wheel which consists of two round flat pieces of wood, the lower one being about twice the size of the upper one. The two are joined together with a bar which revolves in a simple improvised bearing. Such a form of turntable is common over a widespread area in the Near East. The clay is worked with the hand, but is finally smoothed with a bit of leather before the slip is applied. In form many of the pots are reminiscent of Hellenistic shapes. There is a considerable amount of variation between the work of the different villages.

It must always be remembered as a caution that modern potters are extremely liable in an island like Cyprus to be inspired by ancient pottery, and it is sometimes not easy to discover whether a man is consciously imitating the antique or is making a traditional form. The Cypriot police are continually seizing perfectly modern ware under the impression that it is ancient and illegally obtained.

I have unfortunately had little opportunity of observing the agricultural processes. The plough consists of a horizontal piece of wood into which an upright is set with a small crossbar to steer with; at an angle of 45 degrees a long piece of wood is inserted which is fixed to the heavy wooden yoke which rests on the shoulders of the oxen or cows. The ploughman is armed with a long stick with a hornlike projection. The instrument in general use for separating the grain from the husk is called *dhochane*. There is no English equivalent, but it will be familiar under the Vergilian name of *tribulum*. The sickles are similar in shape to those which have been used from time immemorial in the Eastern Mediterranean lands; they are coarsely serrate, a legacy possibly from Neolithic times.

The grain is stored, as it is in many parts of North Africa, in underground granaries called *vouphai*, the same name that is applied to the gibbet form of loom. The Cypriot granaries have only a small entrance, and are hollowed out underneath; the mouth is closed by a stone.

The baskets in common use are of two classes; first the *zymbeli*, a folding basket like a carpenter's toolbag. It is made of straw, and the ordinary form is a four-straw 2/2 twill. It is unnecessary to point out the extremely wide range of this form of basket in the Near East. The ordinary colloquial Arabic name is *zymbel*. It appears that the *zymbeli* has been in use in Cyprus since Bronze Age times. The other form of basket is called the *kaluthi*. This is a round basket with a flat bottom, the diameter at the bottom being about half the diameter at the top. It is made of



wicker work of every size, from a small basket with a handle which the girls carry on their arms to a large depository for corn or oranges nearly 3 feet high.

Considerable interest and importance attaches to the houses from an archaeological point of view. There is a good deal of variation in the plan, partly owing to force of circumstances as well as individual taste. Unless a person is very poor, he will always own his own house. Every house always has its courtyard in which the general work of the household goes on. In some cases this courtyard will be completely surrounded by the house. In many villages all the houses are only of one storey. At Enkomi, for instance, the Priest's house alone has an upper chamber. The usual form of house has a stone foundation, the upper part being made of a series of flat bricks made of mud and straw baked hard in the sun. The house is supported on an arch of stone which is built first and is situated about the middle. This carries the roof, which is made of timbers laid longitudinally, and reeds laid upon them transversely. The top is smeared with mud. The sun bakes such a house to a fair hardness, and in the rainy season the surplus water is carried off from the roof by hollow tubes of Famagusta or similar ware. A house if not looked after readily falls in ruin, and in a very few years little remains to show of the former habitation beyond innumerable broken sherds. This process can be seen going on in Cyprus to-day, and shows that in excavating ancient sites we may often expect to find little beyond the stone foundations and the fallen remains of the arch. In addition to this, in most cases the cooking is done in the open air, so that there is little chance of the domestic hearth baking the walls, as has happened in Egypt.

It must not be supposed that domestic architecture is limited to flat mud-roofed hovels. Many of the houses have fine ogive arches, with the suggestion of a carved capital. This form of work is typical of the monasteries, but is by no means limited to them; it is strongly reminiscent of the mediæval ecclesiastical architecture, and if that be its true source we have an interesting legacy from the West. Many of the houses are especially built to contain the flat circular and the oblong stones which form the mill and the press respectively for pressing the olives. In such a case the living rooms are either on the top or in a separate building.

The door of a Cypriot house is characteristic; it is made of two folding doors which are kept shut by bits of wood fastened to the inside of the lintel at right angles to the door. They are fastened by the ends furthest away from the floor, and drop a little so that the door catches against them, and a notch is cut so as to fix it more firmly. About the centre of the door is a wooden bar, which is free to move in an upright direction. By moving it upwards it impinges against the catch already mentioned, and the door can then be opened.

The house is then for the most part very early in form, and probably has changed little from early times; it is important to note that we seem here to find a definite note of Western influences. I except, of course, the efforts of modern architects and the beautiful work that still survives from Lusignan times, but which is



essentially non-Cypriot in character, but wish to emphasize the fact that the Cypriot have made this non-Cypriot mediæval work their own in some of the modern houses.

The musical instruments in common use are the *avlos* or shepherd's pipe or whistle with six holes at the top and one hole underneath, and the clarionet (*katsambouna*), which has either a single or a double pipe. Sometimes the names are applied indifferently to one or the other. My Greek friends were always most anxious to have me understand that the clarionet was exclusively a Turkish instrument, but the ones I obtained were got from the Greeks. Among the stringed instruments may be included a kind of fiddle and a mandolin with a very long neck. Repeated enquiries failed to discover bagpipes, though they have been alleged to exist in the remote mountain districts. It will be seen again that the musical instruments have a very wide dispersal in the Mediterranean area; they are for the most part decidedly Oriental in character.

Owing to the efforts of various educational authorities, illiteracy is decreasing among the younger generation in Cyprus. It is still, however, common to find a pictographic method in use in the cafés for keeping the reckoning, and for scoring at cards. Although there is considerable variation between the various villages the general principles are clear. First, certain ideograms are used; a scrawl like a baby's feeding bottle represents a bottle of wine. The numbers are continually used as follows: a perpendicular stands for a unit, five is sometimes indicated by a cross and sometimes by a circle, ten either by a circle, by a theta, or by a cross inside a circle, twenty by a cross inside a circle, where that symbol has not already been utilized previously; if it has, there seems to be no alternative. Fifty is written by a loop on top of a perpendicular, and a hundred by two fifties. It will be seen that two of these symbols are not dissimilar to Arabic numerals, namely, the circle and the symbol for fifty. The Arabic symbol for five is, however, not circular, and it is possible that the two signs are connected, but the value of the looped line is in Arabic nine, not fifty. It must also be remembered that the people I saw using these signs were not Turks for the most part, but Greeks, and the Turks whom I saw using them held up their hands in wonder when I wrote some words in the Arabic script. I see, therefore, no reason for not giving these numerals the definite status of ideograms. If we take a series in common use, it will be seen that they differ from either the Arabic or allied systems of perfected numerals in being cumulative in their nature. At Enkomi a man scores at cards in this way. He chalks down units up to four, then he rubs them out and writes a circle, adds units to ten when he erases them, and draws a line through the circle, draws units up to fourteen then adds a circle; at twenty he erases the added nine and draws another line through the theta, which thus becomes a circle with a cross in it. (I only use the term theta for the sake of description, and see no reason to suppose that it is a theta.) Mr. Henry Balfour, the Curator of the Pitt-Rivers Museum, has suggested that the cross for five represents the thumb of a hand stretched across the fingers. A similar



line of reasoning will account for the other symbols, and the fact that the system in its completest form has a basis of fives and twenties seems undoubtedly to associate this system with the fingers. No clues have presented themselves as to the origin of the sign for fifty. The use of ideographic numerals for keeping accounts is very widespread. The subject has been treated very thoroughly by Mallery (*B. of Ethnology*, Vols. 1, 4, 10). It seems from his paper that the Indians use the cross for ten. In the absence of comparative data, it is difficult to find the exact affinities of the Cypriot system, which must await further study.

I made numerous but unsuccessful attempts to collect children's toys. Most of the boys used little wooden bullroarers which they called *foveristra*, *zizirista*, or *vounistra*. They pierced a potsherd and put a bit of string through a hole in the middle, and holding one end of the string in each hand they made the sherd revolve. They also made one walnut revolve on top of another by the same means. Of missile weapons universally popular among small boys, I found two—a "Turkish cannon" made of reed, and a very much attenuated bow, which fired a quarrel made of a twig of wood shaped like a chicken's breast bone.

It will be seen then from this brief survey of the culture and tendencies of Cyprus that as might be expected the island has much that is common with the Levant. Such of their work as is apparently endemic is a survival from an earlier period. Sometimes in Cyprus, "Bronze Age" pitchers go to the fountain in company with disused kerosene tins, elsewhere the former are only to be found by the spade of the archæologist, associated with stone celts or bronze implements.

#### V.—DEMOGRAPHY.

It has been shown that in early times historians called attention to the presence of Greek and Phœnician cities. In the account of Richard's landing, Benedict of Peterborough speaks of Greek and Armenians as apparently representing separate entities. In modern times the two divisions are called Greeks and Turks. The Census returns give us a fairly accurate method of gauging what proportion of the population is represented by these two divisions. The Census—I quote from the convenient summary given in the "Cyprus Handbook"—has two subdivisions which are important for our present purpose. The first is based on language, the second on religion. Out of a total of 274,108, which was the total population in Cyprus at the time of the Census of 1911, 216,310 (78·9 per cent.) spoke Greek, 55,213 (20·1 per cent.) Turkish, 1036 (·4 per cent.) Arabic, 551 (·2 per cent.) Armenian, 490 (·2 per cent.) English, while other languages were spoken by 508 persons. This includes the military population. From the linguistic point of view, one man in every five speaks Turkish, very nearly 79 people in every hundred speak Greek, and only one man in every five hundred has English as his mother tongue. It is admittedly true that language is a thing that easily tends to be swamped, but these figures show, roughly speaking, that the British occupation does not tend to



spread the English tongue except for official purposes, and in a purely bi-lingual way. Language is notoriously a bad index of race, but these data seem to indicate that for the most part the English element represents a purely official class.

If we pass on to the contrast between the Greek and Turk linguistically, the large proportion of Turks becomes at once evident. It must not be supposed that all these are historically of Osmanli origin. The Turks have succeeded in imposing their language on a great proportion of the inhabitants of Asia Minor.

The other languages are not sufficiently numerous to be of historical importance.

Turning to religion, 214,480 persons belonged to the Orthodox Greek Church, 56,428 were Moslems, 1073 Maronites, 815 Roman Catholic, 549 Gregorian Armenian, 397 Church of England, 193 Jews, 173 other religions, including 9 of the Armenia Uniate Church. Of these religions the only one that seems to be associated with language is the Armenian. There are therefore 551 whose mother tongue is Armenian and 557 belonging to the Armenian Church; about .2 per cent. of the population then may definitely be said to be Armenian.

The rule so often stated that "Greek" and "Turk" is a purely religious division does not hold in Cyprus, for of those who give Greek as their mother tongue 1191 are Moslems, and of those who give Turkish as their mother tongue 139 are Greek Christians. It is not improbable that in Cyprus as elsewhere converts to Islam were made at the point of the sword, and that therefore we should expect some Greeks to be followers of the prophet. This is further borne out by the existence in Cyprus of the "Linovamvakoi," "Linsey-woolsies," who while calling themselves Ahmed and Suleiman and outwardly acknowledging Mahomet, in secret are said to have practised the rites of the Greek Church. Summing up our evidence on this point we find that though generally speaking it is true that "Turk" means a Turkish-speaking Moslem, Greek a Greek-speaking Greek Christian, and Armenian an Armenian-speaking Armenian Christian, the correlation of language and religion is not completely positive.<sup>1</sup>

To-day one man in every five is a "Turk." This Turkish population is not by any means pure Osmanli, the term but means as elsewhere Mohammedan. Some of the villages are pure Turkish, some mixed, some pure Greek. The Greeks for the most part profess to have no dealings with the Turks, and Turks and Greeks do without any doubt represent a very strong line of social cleavage, separated as they are by language, religion, social customs, and so on. The West and East do not mix here.

Table I gives an attempt to collect the evidence for the population of Cyprus from the Turkish conquest. The Census figures of 1911 have been included for

<sup>1</sup> Von Luschan, in his Huxley Lecture, has laid considerable emphasis on the relation of social cleavage to physical anthropology. He states that Monophysite Christians are brachycephalic in contrast with their longer-headed and heretical neighbours, and believes that small religious communities by practising strict endogamy may preserve in a pure form a racial type which outside the community has been swamped by the infiltration of fresh blood.

comparison. It will be seen that the original Turkish estimate reckoned five Greeks to one Turk and the modern census four Greeks to one Turk.

TABLE I.—*Population of Cyprus.*

| Date. | Greeks.   | Turks.    | Total.          | Authority.               | Remarks.   |
|-------|-----------|-----------|-----------------|--------------------------|--|
| 1570  | —         | —         | 197,000         | Coronelli ...            | Quoted by Cyprianos. The population previous to the Turkish conquest. A very uncertain figure.   |
| 1571  | 150,000   | 30,000    | 180,000         | Seyyahat Namet           | The original census of the island.   |
| 1563  | —         | —         | 15,000 villages | Elias of Pesaro          |  |
| 1580  | —         | —         | 14,000 villages | Ricaut                   |  |
| 1596  | 25-26,000 | 4-5,000   | 30,000          | Dandini...               | Population of Nicosia.   |
|       | —         | 12-13,000 | —               | do.                      |  |
|       | —         | —         | 100,000         | Estimated ...            | From Dandini's figures. This probably gives too low an estimate.   |
| 1700  | —         | —         | over 300,000    | Heyman ...               | "Some years since . . . many removing every year on account of the prodigious taxes."  |
| 1738  | 12,000    | 6,000     | —               | Pococke ...              | Excludes women and children. Pococke appears to have the same figures at his disposal as Drummond and not to have made a critical use of them. |
| 1745  | 50,000    | 150,000   | 200,000         | Drummond ...             | In the villages there are 4000 Turks who pay the contribution and 12,000 Christians.   |
| 1777  | 37,000    | —         | 84,000          | Cyprianos quoting Census | This is again based on the 12,000 Christians. Cyprianos adds there are grave doubts about the number of Moslems.                               |
| 1792  | —         | 60,000    | over 80,000     | De Vezin                 |  |
| 1815  | 40,000    | 20-30,000 | 60-70,000       | Turner                   |  |
| 1814  | —         | —         | 70,000          | Gordan ...               | This is put as an outside figure. The population was said to be daily diminishing.   |
| 1821  | 80,000    | 20,000    | 100,000         | Tricoupi                 |  |
| 1845  | 85-90,000 | 25,000    | 110-115,000     | Ross ...                 | The 25,000 Turks includes 5000 Negro slaves.   |
| 1911  | 216,310   | 55,213    | 274,108         | Census ...               | 139,383 ♂ 134,725 ♀  |

## VI.—PHYSICAL ANTHROPOLOGY.

1. *Methods.*

The measurements both on crania and on the living over about 50 mm. were taken with a "Mathieu" craniometer, measurements under about 50 mm. were taken with



a "Columbus" gauge. The stature was measured by a special instrument devised by Professor Arthur Thomson. The arithmetical means have in all cases been tabulated. Where the number was sufficiently large to warrant the calculation the following have also been worked out :—

- (1) Probable error of the mean.<sup>1</sup>
- (2) Standard Deviation and its probable error.
- (3) Coefficient of Variation and its probable error.

<sup>1</sup> The probable error gives the measurement within which it is an even chance that the mean or other character which is being considered will fall; thus if we have a mean of 100.41 mm. with a probable error of .12, written  $\pm .12$ , we wish to imply that with the data under consideration it is an even chance that the means will fall between the limits 100.53 and 100.29 or outside these limits.

It may be argued that to know the "even chances" is of little value; the probable error is, however, used as a convenient starting point from which to gauge other chances.

This can be illustrated as follows; it must be remembered that we are dealing in every case with means (or averages) not with individuals. Suppose that we have a series of a hundred head-breadths representing the means of 100 groups with their probable errors. Let us call them Group A, Group B, Group C, Group D, etc.; the order in which we take them is immaterial. We are anxious to discover whether Groups B, C, D, etc., are likely or not to occur as chance deviation of the same population as that from which Group A is derived. Let us tabulate them:

*Means.*—Group A  $150 \pm .5$ ; Group B  $151 \pm .01$ ; Group C  $151.5 \pm .3$ ; Group D  $149.5 \pm .5$ .

It is necessary to work out the differences of B, C, D, etc., respectively, from A, and the probable error of each difference. This latter is obtained by taking the square root of the sum of the square of both probable errors in each case, e.g., in the case of A and B the difference between the means is 1 and the probable error of the difference is  $\sqrt{(.5)^2 + (.01)^2} = .5$ .

Tabulating :—

| Group. | Mean.          | Differences from A. | Probable error of difference.        |
|--------|----------------|---------------------|--------------------------------------|
| A      | 150 $\pm .5$   | —                   | —                                    |
| B      | 151 $\pm .01$  | + 1.0               | $\pm \sqrt{(.5)^2 + (.01)^2} = .5$   |
| C      | 151.8 $\pm .3$ | + 1.8               | $\pm \sqrt{(.5)^2 + (.3)^2} = .5831$ |
| D      | 149.5 $\pm .5$ | — .5                | $\pm \sqrt{(.5)^2 + (.5)^2} = .7071$ |

With this information, assuming that the means and standard deviations follow the normal law, we can calculate the chances whether the means of B, C, and D, etc., represent a mere chance deviation of the same population as Group A or not (Karl Pearson, *Tables for Statisticians*, xvii; and Table II). The chances are tabulated below :—

| Group compared with Group A. | No. of trials. | No. of times occurring. | No. of times not occurring as samples of same population as Group A. | Betting chance against occurring.      |
|------------------------------|----------------|-------------------------|--|--|
| B                            | 100            | 18                      | 82   | 4.6 to 1                               |
| C                            | 100            | 4                       | 96   | 24 to 1                                |
| D                            | 100            | 63                      | 37   | 5 to 9                                 |
|                              |                |                         |  | (Here the betting chance is in favour) |

The measurements have been grouped as follows: First, all those taken have been treated as a whole and the means, standard deviations, etc., calculated. Secondly, four groups of villages have been made, purely on a geographical basis. The first group includes men from Kythrea, a few from Nicosia and from various

Betting chances then are in favour of D being a mere chance variation of A, and not very much against B being a chance variation of A. It must be noted that it is immaterial whether the sign of the difference is plus or minus. That is to say, if the mean of Group C had been  $148.2 \pm .3$  instead of  $151.8 \pm .3$ , the odds against it occurring as an error of random sampling would still be 24 to 1 against.

It might happen that, although the difference between the means was insignificant, the dispersion was different.

An exactly similar method may be applied to standard deviation.

Formulating a general maxim, we may say that when the differences between the means of two groups is not greater than three times the probable error of this difference (the number 3 being taken as a convenient standard), the odds are not sufficiently great (being less than 22 to 1 against) to be very significant, or to prove that the two groups are not samples of the same population. When, however, the difference between two means is more than three times the probable error of the difference, the deduction is that the two are not samples of the same population, the odds being greater than 22 to 1 against.

The same line of reasoning may be applied to standard deviations.

The probable error then is among other things of value in deciding whether the difference between two means or between two standard deviations is significant. The following example taken from the Cyprus material, for the working out of which I am indebted to Prof. Karl Pearson and Miss Elderton, will illustrate the matter.

#### HEAD LENGTHS.

##### *I.—Means.*

| Lapethos.          | Enkomi.            | Difference. | Probable Error of Difference. |
|--------------------|--------------------|-------------|-------------------------------|
| $182.365 \pm .323$ | $178.404 \pm .339$ | 3.961       | $\pm .468$                    |

##### *II.—Standard Deviations.*

|                  |                 |      |            |
|------------------|-----------------|------|------------|
| $7.133 \pm .228$ | $6.500 \pm .24$ | .633 | $\pm .331$ |
|------------------|-----------------|------|------------|

The difference between the two means (3.961) is more than eight times its probable error (.468) and therefore is markedly significant in the sense that we can deduce from this that there are very great odds against these two groups being samples of the same population. The odds are about 2500 to 1 against, when worked out exactly.

The difference between the standard deviations (.633), however, is not twice their probable error (.331) and therefore is of no significance, proving that in each series the range of dispersion is about equal.

The probable error then will tell us two things: first, how far, within limits, our mean is representative of the population we are discussing; and secondly, whether the difference between two groups is such as to warrant our supposing that they do or do not represent samples of the same population.



parts of the centre of the island; the second, men from Lapethos, Karavas, Akanthou, and Hagios Ambrosios. These villages from which most of the subjects come are situated on the north coast between the mountains and the sea, in a pleasant coastal strip that seldom lacks water and is green all the year round. The third group includes the villages of Enkomi, Limnea and Hagios Sergios—a desolate strip of land near the ruins of the old town of Salamis and a few miles north of Famagusta. Here water is bad and often scarce, the scenery is desolate in the extreme, and the villages,

The standard deviation is a measure of dispersion of great importance, especially when dealing with mixed populations. It represents the area within which it is an even chance that any given sample will fall. Thus, taking 100·41 as a mean and 4·41 as the standard deviation, usually written  $\sigma$ , it is an even chance that any given sample will fall between the limits 96 and 100·82 or fall outside these limits. In the case of mixed populations where there is a great deal of variation the standard deviation will be very high.

The coefficient of variation is the percentage ratio of the standard deviation to the mean, *i.e.*,  $\frac{\sigma \times 100}{\text{mean}}$ .

This can be illustrated by comparing the standard deviations and coefficients of variation of the bizygomatic breadth and the upper facial height.

| Character.              | Mean.  | Standard Deviation. | Coefficient of Variation. |
|-------------------------|--------|---------------------|---------------------------|
| Bizygomatic breadth ... | 136·89 | 4·90                | 3·58                      |
| Upper facial height ... | 67·41  | 4·62                | 6·85                      |

The standard deviation or range of dispersion of the bizygomatic breadth is actually greater than the standard deviation or range of dispersion of the upper facial height by ·28 mm., but the mean of the upper facial height, 67·41 mm., is so much less than the mean of the bizygomatic breadth, 136·89 mm., that a smaller standard deviation or measure of dispersion is of greater significance.

We wish to find, then, some method of expressing this. As in working out the cephalic index we reduce the head length to 100 units and express the head breadth in terms of this, so in working out the coefficients of variation we reduce the *mean* to 100 units, and the standard deviation or range of dispersion expressed in these terms is called the "Coefficient of Variation."

| Character.              | Mean.  | Standard Deviation. | Mean reduced to 100 units. | Standard Deviation proportional to mean of 100 units. (Coefficient of Variation.) |
|-------------------------|--------|---------------------|----------------------------|---|
| Bizygomatic breadth ... | 136·89 | 4·90                | 100                        | 3·58  |
| Upper facial height ... | 67·41  | 4·62                | 100                        | 6·85  |

It is, in fact, a simple proportional sum. It forms a convenient method of comparing a series of standard deviations.



especially Enkomi, are scarcely more than a collection of ruins and mud huts. The fourth group includes the village of Levkoniko, a prosperous village in the Central plain of Mesaoria. Although there is evidence of wells having dried up, the village is well watered, there is sufficient water for the cultivation of American cotton, and the people have a prosperous, well-fed appearance. Geographically this group may be said to stand halfway between the villages on the north of the Kyrenia Mountains (Group II) and the villages round Salamis (Group III).

The measurements of the crania have been tabulated in the conventional order. It was considered most satisfactory in dealing with the statistics of the living to guide the eye by arranging measurements in ascending order of variation, but in order to avoid confusion the order of the variations of the total not divided into groups was adopted uniformly. As it has not been possible in every case to include every man measured in the totals the number of individuals included is stated.

## 2. *Crania.*

Unfortunately, in spite of considerable excavations, only a few skulls in sufficiently good condition to measure were obtained. In addition to those excavated in 1913, however, a few crania have been preserved in the Cyprus Museum at Nicosia; some of these appeared to be modern. The skull referred to by Duckworth (*Studies in Anthropology*, p. 204) could not be identified. It is noticeable that the most brachycephalic skulls are of late date (Early Iron Age and Roman), but that otherwise the mesaticephalic group and the dolichocephalic group are represented in both the Bronze Age and in the later groups.

In general the Bronze Age skulls from Cyprus appear to be more round-headed than early Bronze Age skulls from Crete,<sup>1</sup> where the cephalic index of six skulls from Hagios Nikolaos is 74.2, 74.3, 80.4, 72.7, 71.5 and 78. Two of the Cretan crania, however, approach the Cypriot type, and the double grouping found in Cyprus occurs.

Examples of a type with heavy brow ridges occurred in the cemetery at Lapethos. Duckworth<sup>2</sup> has drawn attention to this type in Syria. Unfortunately most of the fragments of crania of this class were too broken for accurate observation, and it is not felt that at present any significance can be attached to it. It occurs sporadically but very markedly among the living.

Table IV illustrates the comparison between the crania and the living. The table has been divided into two parts: (1) all the crania are compared with all the adult males; and (2) the Bronze Age skulls from Lapethos are compared with the modern inhabitants of the same neighbourhood. There is on the whole greater difference between Group II and the Bronze Age skulls than between either the Bronze Age or total crania and all the adult males. The general differences are not greater than might be expected considering that the skulls are of both sexes and the living all males. The

<sup>1</sup> Duckworth, *Trans. British School at Athens*, Vol. ix.

<sup>2</sup> *Studies in Anthropology*, p. 203 *seq.*



most significant feature is that the minimum frontal diameter is very widely different, and that the upper facial height and nasal heights are almost exactly similar.

It will be seen that, when all the measurements are arranged in descending order of stability (*see* Table II), three main classes appear :—

- (1) A relatively stable class including bizygomatic width, head breadth, stature and head length.
- (2) A second less stable class including bimalar breadth, external orbital breadth, and bigonial breadth.
- (3) A very unstable class containing nasal height, intraorbital height and nasal breadth.

Intermediate between (1) and (2) is the minimum frontal diameter, and intermediate between (2) and (3) is the upper facial height.

The indices represent in an exaggerated form the instability of the classes.

Professor A. Thomson has shown that the two main factors in dealing with head shape are (1) the length of the base of the skull (basinasal length), and (2) the cranial capacity. Without elaborating the matter further it would appear that stature should be correlated to head length, but that sitting height or other measure representing the height of the vertebral column would represent a more close correlation. At present our figures are limited to stature and head length; they show that the groups with the highest stature have the shortest heads.

|                       | Group I. | Group II. | Group III. | Group IV. |
|-----------------------|----------|-----------|------------|-----------|
| Stature ... ..        | 1678·8   | 1680·0    | 1691·0     | 1698·8    |
| Head Length ... ..    | 183·1    | 182·4     | 178·4      | 178·3     |
| Cephalic index ... .. | 81·4     | 81·9      | 83·4       | 84·2      |

It is clear therefore that it is necessary to seek some further explanation of the matter. A second point appears from the tables, namely, that whereas head length and stature have very similar coefficients of variation, taken as a whole the means of groups vary very considerably but that the head breadth means are relatively stable. It is possible, therefore, that we may see in this an indication of certain racial traits which appear in the Mediterranean.

Now there is considerable evidence of two conventional types of man in the Mediterranean basin: (1) Mediterranean man with a cephalic index of about 78, and (2) a type of Alpine man with a cephalic index of about 84. Comparative figures are difficult to obtain, especially to illustrate the degree of mixing, but the following table will make the point clear.

| Place.     | No. of Observations. | Cephalic Index. | Standard Deviation. | Coefficient of Variation. | Observer.                 |
|------------|----------------------|-----------------|---------------------|---------------------------|---------------------------|
| Lycia ...  | 179                  | 80.27 $\pm$ .35 | 6.94 $\pm$ .25      | 8.65 $\pm$ .31            | von Luschan. <sup>1</sup> |
| Crete ...  | 320                  | 79.26 $\pm$ .16 | 4.24 $\pm$ .11      | 5.35 $\pm$ .14            | " "                       |
| Cyprus ... | 586                  | 82.54 $\pm$ .11 | 4.09 $\pm$ .08      | 4.96 $\pm$ .08            | L.H.D.B.                  |

In regard to the population of Lycia the very high deviation amply confirms von Luschan's statement of two races being represented. The two types he figures appear frequently in Cyprus, but the mixing or stabilizing of type has progressed much further in Cyprus than in Anatolia. Again there is undoubtedly a certain resemblance between many Cypriots and Cretans; it would appear possible therefore that of the racial type with a head about 148 mm. broad, Cyprus represents most clearly the short-headed type (180 mm. long), and Crete the long-headed type (186 mm. long), and that in Anatolia the two are in an unstable condition.<sup>2</sup>

It is possible that the explanation of the irregularities dealt with above may lie in varying degrees of this fourfold mixture, and that certain types are, apart from the varying needs of body mechanism, correlated to a large degree with actual body size, normally endowed with a more extensive central nervous system.

In the measurements of the face the most remarkable anomalies occur in the external orbital diameters. This would appear to depend on the variations of the intra-orbital breadth which has in its turn been shown to depend on the breadth of the nose.

|                               | Group I. | Group II. | Group III. | Group IV. |
|-------------------------------|----------|-----------|------------|-----------|
| External orbital diameter ... | 99.50    | 101.33    | 100.04     | 106.24    |
| Intraorbital diameter ...     | 31.13    | 31.35     | 31.30      | 32.48     |

There are indications that the upper facial height might be related to the height of the nose; this is not, however, borne out by the evidence of Group III.

|                         | Group I. | Group II. | Group III. | Group IV. |
|-------------------------|----------|-----------|------------|-----------|
| Upper facial height ... | 67.55    | 66.57     | 67.35      | 69.31     |
| Nasal height ...        | 49.58    | 49.45     | 51.78      | 51.89     |

It is noticeable, however, that whereas the nasal height taken as a basis of classification, in agreement with the cephalic index, would associate Groups I with II and

<sup>1</sup> These figures have been reduced from von Luschan's individual measurements (*Archiv. für Anthr.* 1889 and *Zeitsch. für Ethnol.* 1914). His "ungefähres Mittel" and other similar approximations appear to be extremely approximate and entirely unreliable.

<sup>2</sup> The further elaboration of this point must be dealt with when it has been possible to reduce to a comparative condition other statistics dealing with the same area.



III with IV, the nasal index does not form any clear basis for classification, especially since Group III possesses a nose both relatively and absolutely longer and narrower.

The excessive instability of the nose and intraorbital breadth appears to be a matter of great importance. We have so far only mentioned four possible factors in the ethnology of Cyprus. There is a fifth, however—the negro—that is of great importance. At present there is no evidence of the presence of negroes in Cyprus in early times; the introduction during mediæval times of African hunting animals may or may not have been accompanied by the importation of negro slaves.

Ross, writing in 1845, states that at that time there was a population of about 110,000 of whom 25,000 were Turks, including 5000 negro slaves. We have then certain evidence of 4 per cent. of the population being negroes at this time, and it would appear probable that there has been a considerable influx of negro blood at least since 1591 and possibly before. At the present day a peasant presenting all the characteristics of a negro is not uncommon, although personal observation would lead me to believe that the proportion is small. This negro blood would, however, appear as a possible explanation of the very high nasal indices which occur. Observations made on living negroes<sup>1</sup> in the island tend to confirm this belief; except for the nose and in some cases the high stature—due possibly to Nilotic origin—the negro measurements taken individually fell within the Cypriot groups.

From these general considerations and from an examination of the tables it would appear that (1) in spite of the comparative stability of the first group there is evidence of two classes of head length in Cyprus, and that contrary to expectation this appears to be inversely correlated with stature. On the basis either of stature or head length Groups I and II might be associated together.

(2) Among the facial measurements the external orbital diameter shows the greatest divergence within groups, the great difference between Group IV and the other groups would appear to require further investigation. The upper facial height of this group is also unusual. These divergencies may possibly be accounted for by reference to correlations with nasal measurements.

(3) The nasal height appears to associate itself with the racial groups indicated by the varying head length, while the excessive instability of the nasal and intra-orbital breadths may be possibly accounted for by the admixture of negroid elements in addition to the other possible racial admixtures outlined above.

(4) On the evidence of the few crania which are available in such cases where comparison can be made, the population does not appear to have changed appreciably since the Bronze Age. Unfortunately it is not possible to compare the nasal breadths on the living and on crania.

<sup>1</sup> Although there is no "colour" question in Cyprus the ancestry of these negroes was usually rather obscure. They usually say their father was a "Turk," but they are "Turks" themselves. The only nameless man I met in Cyprus was a negro called from his physique "Paschas," the strong. For the effect of Negro intermixture on the nasal index see A. Thomson and D. Randall MacIver, *Ancient Races of the Thebaid*.



The actual correlations between measurements, hair and eye colour, and data dealing with growth have been reserved for a later paper.

As a test to conclusions which have been arrived at on other grounds the means of measurements on the living were subjected to analysis by the method outlined in the note on probable errors. While admitting that more satisfactory mathematical methods could have been used, this method was adopted as lending itself to easy graphical delineation. In the accompanying diagram (Fig. 1) the ordinates of the curve were obtained by dividing the difference between the means of Group I and the means of the other three groups in turn by the probable error of these differences. It has already been explained that where the difference is more than three times its probable error, it is likely to point to the fact that the groups which are compared do not belong to a population which is homogeneous so far as the character under consideration is concerned. The differences for each of the measurements have been tabulated in Table VIII and represented graphically in Fig. 1. A graph has been drawn showing how in some cases the differences between two means divided by the probable error of these differences fall on the left of a dotted horizontal line, whilst others lie to the right of it. This dotted line indicates where  $\frac{\text{the differences between the means}}{\text{the probable error of this difference}} = 3$ .

Now in the cases which fall to the left of the dotted line there is every reason to suppose that the groups possess this common character, whereas where the character falls to the right of the dotted line there is ground for belief that the groups differ in respect of this character. From an examination of Fig. 1 it will be seen that first all four groups appear homogeneous in regard to head breadth, stature and bimalar breadth equally; secondly, Groups I and II are closely allied in head length, upper facial height, both nasal measurements and intraorbital breadth, and in the cephalic and nasal indices. Groups III and IV both agree with each other and differ from Group II in their divergence from the arbitrary standard of Group I in head length, upper facial height, nasal height, nasal breadth and cephalic index; it is of importance to note, however, that Groups I and III are alike in the nasal index, the divergence mentioned above being due to a relative increase in the size of the nasal aperture in Group III and not to a change in its absolute dimensions. So far then we have two classes: Group II agreeing with Group I in cranial measurements and nasal measurements, and differing in facial measurements, and Groups III and IV both differing from Group I in head length and nasal measurements.

Group IV, however, alone differs from the type group in an extraordinary great external orbital and internal orbital width and Group III in the nasal index. Group II differs from the arbitrary standard and from the other groups in the bizygomatic width.

The method adopted would therefore seem to suggest two types, Groups I and II and Groups III and IV, a conclusion that had previously been arrived at on other



grounds. It would suggest, however, that little emphasis should be placed on the nasal index.

The degree of dispersion as measured by the standard deviation was next examined by the same method (*see* Table IX). It was found that generally speaking there was a closer resemblance between all four groups as judged by the standard deviation than as judged by the means, and in order not to confuse the eye, only those characters have been tabulated which showed a significant difference. Groups I and II closely resemble one another, the only significant differences being in the external orbital breadth and in the facial index, in both of which cases there was also a significant difference between the means. The standard deviation of Groups I and III show significant differences in minimum frontal diameter, the external orbital breadth, nasal height and nasal index. Neither in the case of the minimum frontal diameter nor the external orbital breadth do the means show any significant variation; in the nasal height and nasal index, however, there is considerable difference in the means. The standard deviations of Groups I and IV show significant differences in both bigonial breadth (where the difference of the means is insignificant) and in the intraorbital breadth, where the difference of the means is also significant.

TABLE II.—MEANS AND DEGREES OF DISPERSION (NOT DIVIDED INTO GROUPS).

(Unit of measurement is in all cases 1 millimetre.)

| Character.                   | No. of Observations. | Mean.        | Standard Deviation. | Coefficient of Variation. |
|------------------------------|----------------------|--------------|---------------------|---------------------------|
| Bizygomatic width ... ..     | 587                  | 136.89 ± .14 | 4.90 ± .10          | 3.58 ± .07                |
| Head breadth ... ..          | 587                  | 149.10 ± .15 | 5.35 ± .11          | 3.59 ± .07                |
| Stature ... ..               | 585                  | 1687.7 ± 1.7 | 61.6 ± 1.2          | 36.5 ± .7                 |
| Head length ... ..           | 587                  | 180.81 ± .19 | 7.00 ± .14          | 3.87 ± .08                |
| Minimum frontal diameter...  | 538                  | 107.82 ± .13 | 4.54 ± .09          | 4.21 ± .09                |
| Bimalar breadth ... ..       | 587                  | 91.36 ± .13  | 4.61 ± .09          | 5.04 ± .10                |
| External orbital breadth ... | 586                  | 101.30 ± .16 | 5.59 ± .11          | 5.52 ± .11                |
| Bigonial breadth ... ..      | 587                  | 108.02 ± .17 | 6.15 ± .12          | 5.70 ± .11                |
| Upper facial height ... ..   | 587                  | 67.41 ± .13  | 4.62 ± .09          | 6.85 ± .13                |
| Nasal height ... ..          | 586                  | 50.66 ± .11  | 4.11 ± .08          | 8.12 ± .16                |
| Intraorbital breadth ... ..  | 587                  | 31.49 ± .07  | 2.60 ± .05          | 8.25 ± .16                |
| Nasal breadth ... ..         | 587                  | 34.19 ± .09  | 3.09 ± .06          | 9.03 ± .18                |
| <i>Indices—</i>              |                      |              |                     |                           |
| Cephalic ... ..              | 586                  | 82.54 ± .11  | 4.09 ± .08          | 4.96 ± .10                |
| Facial ... ..                | 587                  | 49.52 ± .10  | 3.71 ± .07          | 7.50 ± .15                |
| Nasal ... ..                 | 586                  | 68.08 ± .23  | 8.15 ± .16          | 11.98 ± .24               |

TABLE III.—MEANS AND DEGREES OF DISPERSION (BY GROUPS).

(Unit of measurement is in all cases 1 millimetre.)

## Group 1.

| Character.                   | No. of Observations. | Mean.        | Standard Deviation. | Coefficient of Variation. |
|------------------------------|----------------------|--------------|---------------------|---------------------------|
| Bizygomatic width ... ..     | 111                  | 136.26 ± .31 | 4.79 ± .22          | 3.52 ± .16                |
| Head breadth ... ..          | 111                  | 148.76 ± .38 | 5.99 ± .27          | 4.03 ± .18                |
| Stature ... ..               | 111                  | 1678.8 ± 3.9 | 60.5 ± 2.7          | 36.0 ± 1.6                |
| Head length ... ..           | 111                  | 183.12 ± .40 | 6.18 ± .28          | 3.38 ± .15                |
| Minimum frontal diameter...  | 105                  | 107.65 ± .32 | 4.90 ± .23          | 4.55 ± .21                |
| Bimalar breadth ... ..       | 111                  | 91.06 ± .33  | 5.09 ± .23          | 5.59 ± .25                |
| External orbital breadth ... | 111                  | 99.50 ± .34  | 5.34 ± .24          | 5.37 ± .24                |
| Bigonial breadth ... ..      | 111                  | 106.89 ± .40 | 6.27 ± .28          | 5.87 ± .27                |
| Upper facial height ... ..   | 111                  | 67.55 ± .30  | 4.64 ± .21          | 6.87 ± .31                |
| Nasal height ... ..          | 111                  | 49.58 ± .25  | 3.97 ± .18          | 8.00 ± .36                |
| Intraorbital breadth ... ..  | 111                  | 31.13 ± .17  | 2.70 ± .12          | 8.68 ± .39                |
| Nasal breadth ... ..         | 111                  | 34.50 ± .20  | 3.20 ± .15          | 9.28 ± .42                |
| <i>Indices—</i>              |                      |              |                     |                           |
| Cephalic ... ..              | 111                  | 81.41 ± .26  | 3.99 ± .18          | 4.91 ± .22                |
| Facial ... ..                | 111                  | 50.10 ± .25  | 3.92 ± .18          | 7.82 ± .35                |
| Nasal ... ..                 | 111                  | 69.59 ± .55  | 8.66 ± .39          | 12.45 ± .56               |

## Group 2.

| Character.                   | No. of Observations. | Mean.        | Standard Deviation. | Coefficient of Variation. |
|------------------------------|----------------------|--------------|---------------------|---------------------------|
| Bizygomatic width ... ..     | 222                  | 137.88 ± .22 | 4.96 ± .16          | 3.60 ± .12                |
| Head breadth ... ..          | 222                  | 149.24 ± .24 | 5.19 ± .17          | 3.48 ± .11                |
| Stature ... ..               | 220                  | 1680.0 ± 2.5 | 54.7 ± 1.8          | 32.5 ± 1.0                |
| Head length ... ..           | 222                  | 182.37 ± .32 | 7.13 ± .23          | 3.78 ± .12                |
| Minimum frontal diameter...  | 222                  | 108.18 ± .21 | 4.71 ± .15          | 4.35 ± .14                |
| Bimalar breadth ... ..       | 222                  | 92.05 ± .21  | 4.53 ± .15          | 4.92 ± .16                |
| External orbital breadth ... | 222                  | 101.33 ± .29 | 6.32 ± .20          | 6.23 ± .20                |
| Bigonial breadth ... ..      | 222                  | 109.52 ± .29 | 6.30 ± .20          | 5.76 ± .18                |
| Upper facial height ... ..   | 222                  | 66.57 ± .21  | 4.58 ± .21          | 6.88 ± .22                |
| Nasal height ... ..          | 221                  | 49.45 ± .18  | 4.01 ± .13          | 8.12 ± .26                |
| Intraorbital breadth ... ..  | 222                  | 31.35 ± .11  | 2.48 ± .08          | 7.91 ± .25                |
| Nasal breadth ... ..         | 222                  | 34.24 ± .14  | 2.98 ± .10          | 8.71 ± .28                |
| <i>Indices—</i>              |                      |              |                     |                           |
| Cephalic ... ..              | 221                  | 81.94 ± .18  | 4.02 ± .13          | 4.90 ± .16                |
| Facial ... ..                | 221                  | 48.63 ± .12  | 2.69 ± .09          | 5.53 ± .18                |
| Nasal ... ..                 | 221                  | 69.47 ± .36  | 7.94 ± .25          | 11.42 ± .37               |



TABLE III.—MEANS AND DEGREES OF DISPERSION (BY GROUPS)—*continued.*

(Unit of measurements is in all cases 1 millimetre.)

## Group 3.

| Character.                      | No. of Observations. | Mean.        | Standard Deviation. | Coefficient of Variation. |
|---------------------------------|----------------------|--------------|---------------------|---------------------------|
| Bizygomatic width ... ..        | 167                  | 135.89 ± .25 | 4.74 ± .17          | 3.49 ± .13                |
| Head breadth ... ..             | 167                  | 148.54 ± .28 | 5.39 ± .20          | 3.63 ± .13                |
| Stature ... ..                  | 167                  | 1690.5 ± 3.2 | 60.8 ± 2.2          | 35.9 ± 1.3                |
| Head length ... ..              | 167                  | 178.40 ± .34 | 6.50 ± .24          | 3.60 ± .13                |
| Minimum frontal diameter... ..  | 167                  | 107.25 ± .21 | 3.98 ± .15          | 3.71 ± .14                |
| Bimalar breadth ... ..          | 167                  | 90.81 ± .22  | 4.24 ± .16          | 4.68 ± .17                |
| External orbital breadth ... .. | 167                  | 100.04 ± .22 | 4.30 ± .16          | 4.30 ± .16                |
| Bigonial breadth ... ..         | 167                  | 107.90 ± .31 | 5.90 ± .22          | 4.52 ± .17                |
| Upper facial height ... ..      | 167                  | 67.35 ± .23  | 4.31 ± .16          | 6.79 ± .25                |
| Nasal height ... ..             | 167                  | 51.78 ± .17  | 3.27 ± .12          | 6.31 ± .23                |
| Intraorbital breadth ... ..     | 167                  | 31.30 ± .15  | 2.80 ± .10          | 8.93 ± .32                |
| Nasal breadth ... ..            | 167                  | 33.12 ± .15  | 2.80 ± .10          | 8.46 ± .31                |
| <i>Indices—</i>                 |                      |              |                     |                           |
| Cephalic ... ..                 | 167                  | 83.38 ± .24  | 4.63 ± .17          | 5.55 ± .20                |
| Facial ... ..                   | 167                  | 49.71 ± .19  | 3.61 ± .13          | 7.26 ± .27                |
| Nasal ... ..                    | 167                  | 64.25 ± .36  | 6.91 ± .25          | 10.75 ± .40               |

## Group 4.

| Character.                      | No. of Observations. | Mean.        | Standard Deviation. | Coefficient of Variation. |
|---------------------------------|----------------------|--------------|---------------------|---------------------------|
| Bizygomatic width ... ..        | 87                   | 137.20 ± .30 | 4.16 ± .21          | 3.03 ± .16                |
| Head breadth ... ..             | 87                   | 149.63 ± .38 | 5.22 ± .27          | 3.49 ± .18                |
| Stature ... ..                  | 87                   | 1689.8 ± 4.6 | 63.7 ± 3.3          | 37.7 ± 1.9                |
| Head length ... ..              | 87                   | 178.29 ± .47 | 6.50 ± .33          | 3.65 ± .19                |
| Minimum frontal diameter... ..  | 44                   | 107.95 ± .46 | 4.51 ± .32          | 4.17 ± .30                |
| Bimalar breadth ... ..          | 87                   | 91.07 ± .34  | 4.68 ± .24          | 5.14 ± .26                |
| External orbital breadth ... .. | 86                   | 106.24 ± .34 | 4.63 ± .24          | 4.36 ± .22                |
| Bigonial breadth ... ..         | 87                   | 106.54 ± .34 | 4.76 ± .24          | 4.46 ± .23                |
| Upper facial height ... ..      | 87                   | 69.31 ± .33  | 4.60 ± .24          | 6.63 ± .34                |
| Nasal height ... ..             | 87                   | 51.89 ± .31  | 4.34 ± .22          | 8.36 ± .43                |
| Intraorbital breadth ... ..     | 87                   | 32.48 ± .25  | 3.39 ± .17          | 10.45 ± .53               |
| Nasal breadth ... ..            | 87                   | 35.70 ± .23  | 3.20 ± .16          | 8.96 ± .46                |
| <i>Indices—</i>                 |                      |              |                     |                           |
| Cephalic ... ..                 | 87                   | 84.16 ± .31  | 4.25 ± .22          | 5.03 ± .26                |
| Facial ... ..                   | 87                   | 50.90 ± .28  | 3.87 ± .20          | 7.60 ± .39                |
| Nasal ... ..                    | 87                   | 69.25 ± .55  | 7.50 ± .38          | 10.82 ± .55               |





TABLE VI.—INDIVIDUAL MEASUREMENTS (SKULLS).

L. H. DUDLEY BUXTON.—*The Anthropology of Cyprus.*

| Origin.            | Date.                         | Age.            | Sex. | Glabellar occipital Length. | Greatest Breadth. | Basal-bregmatic Naso-occipital length. | Minimum Frontal Diameter. | Basal-nasal Length. | Basal-alveolar Length. | Bizygomatic Breadth. | Naso-alveolar Length. | Nasal Height. | Nasal Width. | Interorbital Width. | Inter-fronto-malar Width. | Orbital Width. | Orbital Height. | Palato-maxillary Length. | Palato-maxillary Breadth. | Symphysial Height. | Coronoid Height. | Condyloid Height. | Intercondylic Breadth. | Sigmoidal Height. | Cephalic Index. | Vertical Index. | Nasal Index. | Remarks.   |
|--------------------|-------------------------------|-----------------|------|-----------------------------|-------------------|--|---------------------------|---------------------|------------------------|----------------------|-----------------------|---------------|--------------|---------------------|---------------------------|----------------|-----------------|--------------------------|---------------------------|--------------------|------------------|-------------------|------------------------|-------------------|-----------------|-----------------|--------------|--|
| Lapethos. Tomb 204 | Bronze Age ...                | Adult ...       | ♀    | 134                         | 135               | 120                                    | 98                        | 102                 | 98                     | 132                  | 65                    | 50            | 26           | 26                  | 100                       | 40             | 33              | 51                       | 40                        | 27                 | —                | 53                | 95                     | 39                | 73.37           | 65.22           | 52.0         |  |
| " " 204            | " " ...                       | " " ...         | ♀    | 175                         | 143               | 100                                    | 92                        | 127                 | 95                     | 127                  | 62                    | 48            | 23           | 20                  | 90                        | 34             | 34              | 46                       | 34                        | 30                 | 58               | 45                | 107                    | 44                | 81.71           | 57.14           | 47.92        |  |
| " " 18             | " " ...                       | " " ...         | ♀    | 139                         | 139               | 149                                    | 99                        | 110                 | —                      | —                    | 65                    | 46            | —            | 25                  | —                         | 39             | 31              | 55                       | 41                        | —                  | —                | —                 | —                      | —                 | 73.16           | 82.78           | —            | Very heavy brow ridges.                            |
| " " 18             | " " ...                       | Young Adult ... | ♀    | 137                         | 141               | 123                                    | 96                        | 92                  | —                      | 134(?)               | —                     | —             | —            | 21 (?)              | —                         | 34             | 31(?)           | —                        | —                         | —                  | —                | —                 | —                      | —                 | 84.43           | 73.65           | —            |  |
| " " 302            | " " ...                       | Old ...         | ♀    | 179                         | 140               | —                                      | 93                        | —                   | —                      | —                    | —                     | —             | —            | —                   | —                         | —              | —               | —                        | —                         | —                  | —                | —                 | —                      | —                 | 78.21           | —               | —            | Very heavy brow ridges.                            |
| " " 50             | " " ...                       | Young Adult ... | ♀    | 170                         | 143               | —                                      | 99                        | —                   | —                      | —                    | —                     | —             | —            | —                   | —                         | —              | —               | —                        | —                         | —                  | —                | —                 | —                      | —                 | 79.89           | —               | —            |  |
| " " 14e            | " " ...                       | Adult ...       | ♀    | 178                         | 143               | —                                      | —                         | —                   | —                      | —                    | —                     | —             | —            | —                   | —                         | —              | —               | —                        | —                         | —                  | —                | —                 | —                      | —                 | 80.34           | —               | —            |  |
| " " 29             | " " ...                       | " " ...         | ♀    | 135                         | 146               | 144                                    | 105                       | 115                 | —                      | —                    | —                     | —             | —            | —                   | —                         | —              | —               | —                        | —                         | —                  | —                | —                 | —                      | —                 | 78.92           | 77.84           | —            |  |
| " " 50             | " " ...                       | " " ...         | ♀    | 139                         | 138               | —                                      | 98                        | —                   | —                      | —                    | —                     | —             | —            | —                   | —                         | —              | —               | —                        | —                         | —                  | —                | —                 | —                      | —                 | 73.02           | —               | —            |  |
| " " 203            | " " ...                       | " " ...         | ♀    | 173                         | 141               | —                                      | 90                        | —                   | —                      | —                    | —                     | 42            | 23 (?)       | —                   | —                         | 37             | 34              | —                        | —                         | —                  | —                | —                 | —                      | —                 | 81.50           | —               | —            |  |
| " " 14e            | " " ...                       | " " ...         | ♀    | 116                         | —                 | —                                      | —                         | —                   | —                      | —                    | —                     | —             | —            | 20                  | —                         | 40             | 30              | —                        | —                         | —                  | —                | —                 | —                      | —                 | 80.66           | 74.59           | —            |  |
| " " 29             | " " ...                       | " " ...         | ♀    | 141                         | 146               | 135                                    | —                         | —                   | —                      | —                    | —                     | —             | —            | —                   | —                         | —              | —               | —                        | —                         | —                  | —                | —                 | —                      | —                 | 70.29(?)        | —               | —            |  |
| " " 15e            | " " ...                       | " " ...         | ♀    | 15(?)                       | 123(?)            | —                                      | —                         | —                   | —                      | —                    | —                     | —             | —            | —                   | —                         | —              | —               | —                        | —                         | —                  | —                | —                 | —                      | —                 | 77.90           | —               | —            |  |
| " " 29             | " " ...                       | " " ...         | ♀    | 141                         | 141               | —                                      | —                         | —                   | —                      | —                    | —                     | —             | —            | —                   | —                         | —              | —               | —                        | —                         | 31                 | 50               | —                 | 95                     | 43                | —               | —               | —            |  |
| " " 204            | " " ...                       | Young Adult ... | ♀    | —                           | —                 | —                                      | —                         | —                   | —                      | —                    | —                     | —             | —            | —                   | —                         | —              | —               | —                        | —                         | —                  | —                | —                 | —                      | —                 | 77.84           | —               | —            |  |
| " " 21             | " " ...                       | Adult ...       | ♀    | 167                         | 130               | —                                      | 90                        | —                   | —                      | —                    | —                     | —             | —            | —                   | —                         | —              | —               | —                        | —                         | —                  | —                | —                 | —                      | —                 | 79.66           | —               | —            | Probably a female of heavy-browed type.            |
| " " 18             | " " ...                       | " " ...         | ♀    | 177                         | 141               | —                                      | —                         | —                   | —                      | —                    | —                     | —             | —            | —                   | —                         | —              | —               | —                        | —                         | —                  | —                | —                 | —                      | —                 | —               | —               | —            |  |
| Kyrenia ...        | Ptolemaic ...                 | " " ...         | ♀    | 185                         | 143               | 140                                    | 105                       | 110                 | 103                    | 137                  | 71                    | 56            | 25           | 29                  | 105                       | 40             | 34              | 44                       | 45                        | 34                 | 66               | 76                | 98                     | 55                | 77.30           | 75.68           | 44.64        |  |
| Cyprus Museum      | ? Modern ...                  | " " ...         | ♀    | 172                         | 143               | 131                                    | 103                       | 99                  | 95                     | 134                  | 72                    | 53            | 26           | 20                  | 101                       | 41             | 37              | 53                       | 43                        | —                  | —                | —                 | —                      | —                 | 83.63           | 76.61           | 49.06        | General condition shows that probably modern.      |
| Khytroi ...        | Roman ...                     | " " ...         | ♀    | 185                         | 135               | 133                                    | 91                        | 99                  | 90                     | —                    | 65                    | 53            | 24           | 21                  | —                         | —              | —               | 52                       | 36                        | —                  | —                | —                 | —                      | —                 | 72.97           | 71.89           | 45.28        |  |
| Philierro ...      | " " ...                       | " " ...         | ♀    | 173                         | 140               | 141                                    | 99                        | 107                 | 92                     | 134                  | 70                    | 56            | 24           | 24                  | 99                        | 43             | 35              | 45                       | 42                        | —                  | —                | —                 | —                      | —                 | 86.13           | 81.50           | 42.86        |  |
| Kyrenia ...        | ? Modern ...                  | " " ...         | ♀    | 183                         | 142               | 135                                    | 93                        | 99                  | —                      | —                    | 64(?)                 | 54            | 25           | 22                  | 97                        | 41             | 34              | —                        | —                         | —                  | —                | —                 | —                      | —                 | 77.60           | 73.77           | 46.30        | Covered with pitch probably to simulate antiquity. |
| Philierro ...      | Fifth Century ...             | Old ...         | ♀    | 182                         | 137               | —                                      | —                         | —                   | —                      | —                    | —                     | —             | —            | —                   | —                         | —              | —               | —                        | —                         | —                  | —                | —                 | —                      | —                 | 75.27           | —               | —            |  |
| Limassol ...       | " " ...                       | Adult ...       | ♀    | 179                         | 140               | —                                      | —                         | —                   | —                      | —                    | —                     | —             | —            | —                   | —                         | —              | —               | —                        | —                         | —                  | —                | —                 | —                      | —                 | 78.21           | —               | —            |  |
| Kyrenia ...        | Sixth Century to Hellenic ... | " " ...         | ♀    | 166                         | 132               | —                                      | —                         | —                   | —                      | —                    | —                     | —             | —            | —                   | —                         | —              | —               | —                        | —                         | —                  | —                | —                 | —                      | —                 | 79.52           | —               | —            |  |
| Amathus ...        | Early Iron Age ...            | Aged ...        | ♀    | 167                         | 140               | —                                      | 89                        | —                   | —                      | —                    | 65                    | 53            | 21           | —                   | 91                        | 39             | 33              | 49(?)                    | 37                        | —                  | —                | —                 | —                      | —                 | 89.22           | —               | 39.62        |  |
| " " ...            | " " ...                       | Young Adult ... | ♀    | 185                         | 137               | 136                                    | 91                        | 100                 | 95                     | 127                  | 68                    | 50            | 23           | —                   | —                         | —              | —               | —                        | —                         | —                  | —                | —                 | —                      | —                 | 74.05           | 73.12           | 46.00        |  |
| " " ...            | " " ...                       | Adult ...       | ♀    | 185(?)                      | 137               | —                                      | 94                        | —                   | —                      | —                    | —                     | —             | —            | —                   | —                         | —              | —               | —                        | —                         | —                  | —                | —                 | —                      | —                 | 74.05(?)        | —               | —            |  |

A (?) after a figure indicates that owing to the condition of the skull accurate measurement was uncertain.

TABLE IV.—CRANIA AND LIVING PERSONS. COMPARISON OF MEANS.

Crania, Both Sexes. Living Persons, Males.

| Character.                   | Total<br>Crania. | Total<br>Adult ♂ | Difference. | Bronze<br>Age<br>Crania. | Group 2. | Difference. |
|------------------------------|------------------|------------------|-------------|--------------------------|----------|-------------|
| Bizygomatic breadth ...      | 131·84           | 136·89           | 5·05        | 129·5                    | 137·88   | 8·38        |
| Head breadth ...             | 140·4            | 149·10           | 8·70        | 140·5                    | 149·24   | 8·74        |
| Head length ...              | 177·92           | 180·81           | 2·89        | 178·0                    | 182·41   | 4·41        |
| Minimum frontal diameter     | 95·83            | 107·82           | 11·99       | 96·0                     | 108·18   | 12·18       |
| External orbital breadth ... | 97·57            | 101·30           | 3·87        | 95·0                     | 101·33   | 6·33        |
| Upper facial height ...      | 67·00            | 67·41            | 0·41        | 64·0                     | 66·57    | 2·57        |
| Nasal height ...             | 51·00            | 50·66            | 0·34        | 46·5                     | 49·45    | 2·95        |
| Cephalic index ...           | 78·93            | 82·54            | 3·61        | 78·61                    | 81·94    | 3·33        |



TABLE VII.—MEANS OF CRANIAL MEASUREMENTS.

| Measurement.                  | Bronze Age. | Various Dates. | Total.      |
|-------------------------------|-------------|----------------|-------------|
| Glabello-occipital length ... | 178·0 (15)  | 177·8 (10)     | 177·92 (25) |
| Greatest breadth ...          | 140·5 (14)  | 140·4 (11)     | 140·4 (25)  |
| Basi-bregmatic height ...     | 129·6 (5)   | 135·8 (6)      | 133·1 (11)  |
| Basi-nasal height ...         | 100·2 (5)   | 99·9 (9)       | 103·2 (14)  |
| Basi-alveolar height ...      | 96·5 (2)    | 95·0 (5)       | 95·4 (7)    |
| Minimum frontal diameter ...  | 96·0 (10)   | 95·6 (8)       | 95·8 (18)   |
| Upper facial height ...       | 64·0 (3)    | 68·5 (6)       | 67·0 (9)    |
| Bizygomatic breadth ...       | 129·5 (2)   | 133·0 (4)      | 131·8 (6)   |
| External orbital breadth ...  | 95·0 (2)    | 98·6 (5)       | 97·6 (7)    |
| Internal orbital breadth ...  | 22·8 (4)    | 23·2 (5)       | 23·0 (9)    |
| Orbital height ...            | 32·5 (5)    | 34·6 (5)       | 33·6 (10)   |
| Orbital breadth ...           | 37·2 (6)    | 40·8 (5)       | 38·8 (11)   |
| Nasal height ...              | 46·5 (4)    | 53·6 (7)       | 51·0 (11)   |
| Nasal breadth ...             | 24·5 (2)    | 24·0 (7)       | 24·1 (9)    |
| Palatal length ...            | 50·6 (3)    | 48·5 (4)       | 49·4 (7)    |
| Palatal breadth ...           | —           | 40·6 (5)       | —           |
| Intercondylic breadth ...     | 99·0 (3)    | —              | —           |
| Sigmoid height ...            | 42·0 (3)    | —              | —           |
| Coronoid height ...           | 54·0 (2)    | —              | —           |
| Condylod height ...           | 49·0 (2)    | —              | —           |
| Symphysial height ...         | 29·3 (3)    | —              | —           |
| <i>Indices—</i>               |             |                |             |
| Cranial ...                   | 78·61 (14)  | 79·39 (10)     | 78·93 (24)  |
| Vertical ...                  | 71·86 (6)   | 75·43 (6)      | 73·64 (12)  |
| Nasal ...                     | 49·96 (2)   | 44·82 (7)      | 45·96 (9)   |
| Upper facial index ...        | —           | —              | —           |

The figures in brackets indicate the number of measurements. In no case have doubtful measurements been included in the means.

TABLE VIII.—DIFFERENCES OF MEANS.

| Character.               | Difference<br>Between<br>Groups 1 & 2. | Difference<br>Between<br>Groups 1 & 3. | Difference<br>Between<br>Groups 1 & 4. | Remarks.  |
|--------------------------|--|--|--|---|
| Bizygomatic breadth      | 1.62 ± .38                             | .37 ± .40                              | .94 ± .43                              | Difference between Groups 1 and 2 significant.              |
| Head breadth ...         | .48 ± .45                              | .22 ± .47                              | .87 ± .53                              | No significant difference.                                  |
| Stature ...              | 2.2 ± 4.6                              | 11.7 ± 5.04                            | 11.0 ± 6.03                            | No significant difference.                                  |
| Head length ...          | .75 ± .51                              | 4.72 ± .53                             | 4.83 ± .62                             | Significant difference between Groups 1 and 3, and 1 and 4. |
| Minimum frontal diameter | 1.53 ± .38                             | .40 ± .38                              | .30 ± .56                              | Difference between Groups 1 and 2 significant.              |
| Bimalar breadth ...      | .99 ± .39                              | .25 ± .40                              | .01 ± .47                              | No significant difference.                                  |
| External orbital breadth | 1.83 ± .45                             | .54 ± .41                              | 6.74 ± .48                             | Significant difference between Groups 1 and 2.              |
| Bigonial breadth ...     | 2.63 ± .49                             | 1.01 ± .51                             | .35 ± .53                              | Significant difference between Groups 1 and 2.              |
| Upper facial height      | .98 ± .37                              | .20 ± .38                              | 1.76 ± .45                             | Significant difference between Groups 1 and 4.              |
| Nasal height ...         | .13 ± .31                              | 2.20 ± .30                             | 2.31 ± .40                             | Significant difference between Groups 1 and 3, and 1 and 4. |
| Intraorbital breadth     | .22 ± .20                              | .17 ± .23                              | 1.35 ± .30                             | Significant difference between Groups 1 and 4.              |
| Nasal breadth ...        | .26 ± .24                              | 1.38 ± .25                             | 2.20 ± .30                             | Significant difference between Groups 1 and 3, and 1 and 4. |
| Cephalic index ...       | .53 ± .32                              | 2.97 ± .36                             | 2.75 ± .40                             | Significant difference between Groups 1 and 3, and 1 and 4. |
| Upper facial index ...   | 1.47 ± .28                             | .39 ± .28                              | .80 ± .37                              | Significant difference between Groups 1 and 2.              |
| Nasal index ...          | .12 ± .66                              | 5.34 ± .66                             | .34 ± .78                              | Significant difference between Groups 1 and 3.              |

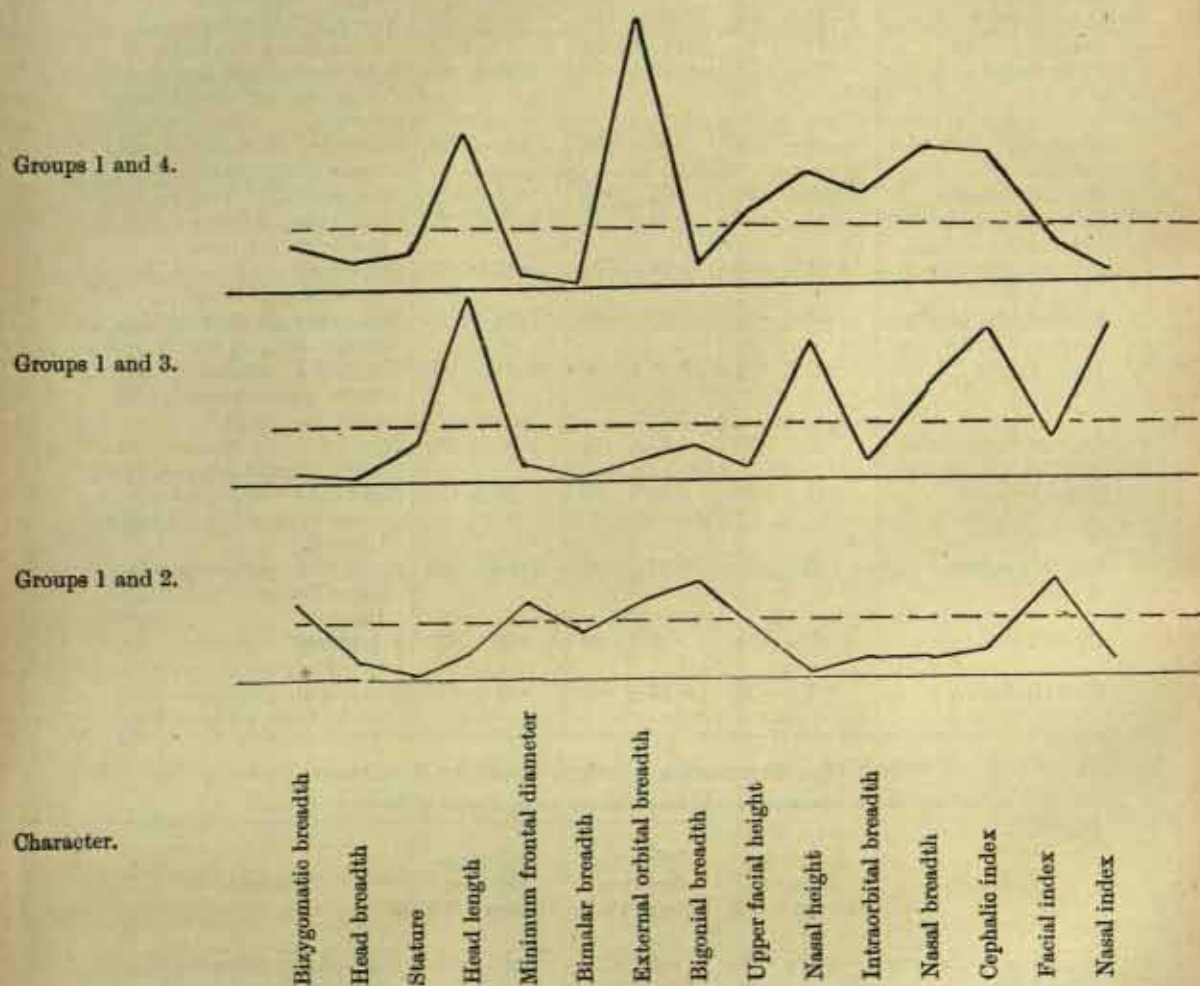
TABLE IX.—DIFFERENCE BETWEEN STANDARD DEVIATIONS.  
(Only those characters tabulated where a significant difference occurs.)

| Character.               | Difference<br>Between<br>Groups 1 & 2. | Difference<br>Between<br>Groups 1 & 3. | Difference<br>Between<br>Groups 1 & 4. | Remarks.  |
|--------------------------|--|--|--|---|
| Minimum frontal diameter | .19 ± .27                              | .92 ± .27                              | .41 ± .39                              | Significant difference between Groups 1 and 3.              |
| Bimalar breadth ...      | .56 ± .27                              | .85 ± .28                              | .41 ± .33                              | Significant difference between Groups 1 and 3.              |
| External orbital breadth | .98 ± .31                              | 1.04 ± .29                             | .71 ± .34                              | Significant difference between Groups 1 and 2, and 1 and 3. |
| Bigonial breadth ...     | .03 ± .34                              | .37 ± .35                              | 1.51 ± .37                             | Significant difference between Groups 1 and 4.              |
| Nasal height ...         | .04 ± .22                              | .70 ± .22                              | .37 ± .28                              | Significant difference between Groups 1 and 3.              |
| Intraorbital breadth     | .22 ± .14                              | .10 ± .16                              | .69 ± .21                              | Significant difference between Groups 1 and 4.              |
| Facial index ...         | 1.23 ± .20                             | .31 ± .22                              | .05 ± .27                              | Significant difference between Groups 1 and 2.              |
| Nasal index ...          | .72 ± .46                              | 1.75 ± .46                             | 1.16 ± .54                             | Significant difference between Groups 1 and 3.              |



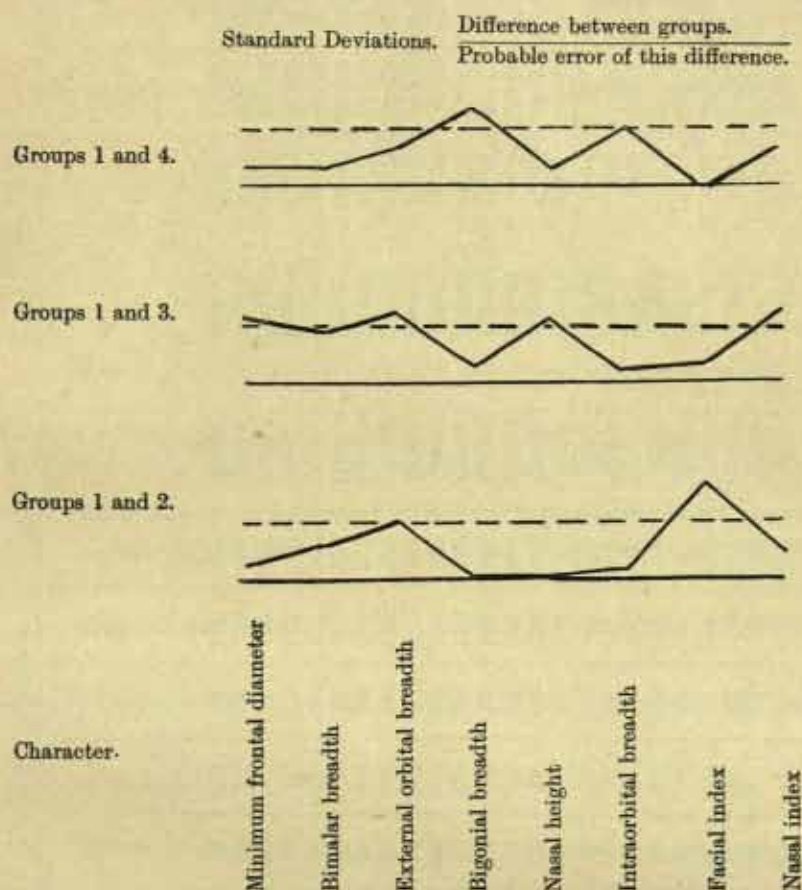
FIGURE 1.

Means.  $\frac{\text{Difference between groups.}}{\text{Probable error of this difference.}}$



The curve indicates the value of the difference between the means of Group 1 and of the other groups respectively, divided by the probable error of this difference. Where this exceeds three—indicated by a broken line—it is unlikely that the groups are homogeneous in respect to this character.

FIGURE 2.



The curve indicates the value of the difference between the standard deviations of Group 1 and of the other groups respectively, divided by the probable error of this difference. Where this exceeds three—indicated by a broken line—it is unlikely that the groups are homogeneous in regard to this character. Where Groups 2, 3 and 4 are homogeneous with Group 1 the curve has not been included.

#### NOTE ON TABLES OF MEASUREMENTS.

The measurements have been arranged by groups, as explained in the body of the paper. Where a number of men from a single village were measured, the name of the village is placed at the top.

The age given is the age stated by the individual, but it is not more than approximate. "18" means a man, i.e., one capable of doing man's work as opposed to boy's work. Immature individuals who claimed to be "men" have been rejected.

The measurements are always given in millimetres. No female measurements have been included.



Group 1.—Nicosia.

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour. | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------|-------------|-----------------|---------------------|--------------|
| 20   | 1,681    | 184          | 146           | 107                       | 73                   | 51            | 36             | 36                    | 98                        | 90               | 135                  | 102               | Black        | Brown       | 79.35           | 54.07               | 70.59        |
| 21   | 1,669    | 188          | 142           | 108                       | 78                   | 54            | 31             | 28                    | 91                        | 88               | 131                  | 90                | Brown        | Brown       | 75.53           | 59.54               | 57.41        |
| 24   | 1,758    | 195          | 156           | 110                       | 70                   | 50            | 34             | 32                    | 98                        | 89               | 142                  | 120               | Dark         | Hazel       | 80.00           | 49.31               | 68.00        |
| 30   | 1,709    | 190          | 145           | 108                       | 70                   | 50            | 28             | 33                    | 100                       | 95               | 137                  | 110               | Brown        | Brown       | 76.32           | 51.10               | 56.00        |
| 40   | 1,700    | 193          | 146           | 101                       | 73                   | 56            | 36             | 29                    | 103                       | 93               | 137                  | 105               | Brown        | Blue        | 75.65           | 53.30               | 64.29        |
| 18   | 1,657    | 177          | 149           | 108                       | 70                   | 55            | 31             | 31                    | 99                        | 88               | 132                  | 106               | Brown        | Brown       | 84.18           | 53.03               | 56.36        |
| 18   | 1,635    | 179          | 150           | 110                       | 63                   | 44            | 33             | 30                    | 100                       | 90               | 138                  | 104               | Brown        | Brown       | 83.80           | 45.65               | 75.00        |
| 18   | 1,681    | 191          | 144           | 108                       | 73                   | 54            | 35             | 30                    | 99                        | 90               | 136                  | 107               | Dark         | Hazel       | 75.39           | 56.61               | 64.81        |
| 19   | 1,591    | 180          | 138           | 100                       | 66                   | 52            | 29             | 28                    | 95                        | 83               | 128                  | 100               | Dark         | Green       | 76.67           | 51.56               | 55.77        |
| 19   | 1,666    | 183          | 148           | 111                       | 74                   | 50            | 36             | 28                    | 100                       | 88               | 131                  | 100               | Dark         | Green       | 80.87           | 56.49               | 72.00        |
| 19   | 1,707    | 178          | 148           | 107                       | 67                   | 45            | 38             | 38                    | 96                        | 92               | 134                  | 100               | Black        | Brown       | 83.15           | 50.00               | 84.44        |
| 20   | 1,695    | 175          | 149           | 103                       | 63                   | 49            | 36             | 29                    | 95                        | 88               | 132                  | 104               | Black        | Brown       | 85.14           | 47.73               | 75.00        |
| 28   | 1,641    | 182          | 148           | 112                       | 67                   | 46            | 39             | 33                    | 97                        | 89               | 136                  | 108               | Brown        | Brown       | 81.32           | 49.27               | 79.59        |
| 70   | 1,656    | 184          | 152           | 107                       | 60                   | 49            | 40             | 38                    | 112                       | 97               | 140                  | 102               | White        | Green       | 82.61           | 42.85               | 81.63        |

Group I.—*Kythera.*

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bigoniac Breadth. | Hair Colour. | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|-------------------|--------------|-------------|-----------------|---------------------|--------------|
| 35   | 1,780    | 186          | 153           | 107                       | 75                   | 52            | 36             | 29                    | 95                        | 87               | 137               | Brown        | Brown       | 82.26           | 54.76               | 69.23        |
| 35   | 1,705    | 187          | 146           | 110                       | 62                   | 45            | 37             | 28                    | 100                       | 95               | 135               | Brown        | Brown       | 78.07           | 45.93               | 82.22        |
| 38   | 1,743    | 179          | 152           | 107                       | 66                   | 45            | 34             | 35                    | 100                       | 95               | 133               | Brown        | Blue        | 84.92           | 49.62               | 75.56        |
| 38   | 1,710    | 191          | 150           | 113                       | 74                   | 50            | 37             | 33                    | 102                       | 98               | 135               | Black        | Brown       | 78.53           | 54.81               | 74.00        |
| 40   | 1,610    | 185          | 150           | 110                       | 70                   | 52            | 30             | 29                    | 97                        | 90               | 137               | Brown        | Hazel       | 81.08           | 51.12               | 57.69        |
| 40   | 1,711    | 176          | 153           | 102                       | 68                   | 50            | 32             | 27                    | 90                        | 85               | 135               | Black        | Brown       | 86.93           | 50.37               | 64.00        |
| 40   | 1,687    | 185          | 150           | 110                       | 75                   | 52            | 32             | 27                    | 93                        | 89               | 137               | Black        | Brown       | 81.08           | 54.72               | 61.54        |
| 40   | 1,617    | 184          | 154           | 119                       | 64                   | 50            | 32             | 30                    | 112                       | 95               | 145               | Brown        | Brown       | 83.70           | 44.16               | 64.00        |
| 40   | 1,897    | 183          | 150           | 110                       | 72                   | 52            | 39             | 29                    | 96                        | 90               | 143               | Brown        | Hazel       | 81.97           | 50.35               | 75.00        |
| 42   | 1,685    | 180          | 147           | 108                       | 67                   | 47            | 32             | 32                    | 102                       | 95               | 140               | Black        | Hazel       | 81.67           | 47.86               | 68.09        |
| 45   | 1,632    | 181          | 151           | 107                       | 73                   | 53            | 40             | 30                    | 100                       | 89               | 135               | Black        | Brown       | 83.43           | 54.07               | 75.47        |
| 48   | 1,683    | 176          | 149           | 105                       | 75                   | 56            | 30             | 29                    | 90                        | 82               | 127               | Medium dark  | Blue        | 84.66           | 59.06               | 53.57        |
| 50   | 1,844    | 187          | 147           | 103                       | 65                   | 50            | 40             | 27                    | 87                        | 82               | 136               | White        | Hazel       | 78.61           | 47.80               | 80.00        |
| 45   | 1,626    | 175          | 148           | —                         | 65                   | 45            | 37             | 29                    | 102                       | 89               | 135               | Black        | Brown       | 84.57           | 48.15               | 82.22        |
| 18   | 1,605    | 186          | 150           | 103                       | 67                   | 48            | 29             | 29                    | 90                        | 85               | 133               | Brown        | Brown       | 80.65           | 50.38               | 60.42        |
| 20   | 1,641    | 182          | 153           | 109                       | 73                   | 50            | 35             | 30                    | 100                       | 95               | 140               | —            | —           | 84.07           | 52.14               | 70.00        |
| 21   | 1,745    | 190          | 135           | 110                       | 65                   | 50            | 38             | 28                    | 95                        | 90               | 136               | Brown        | Brown       | 71.05           | 47.80               | 76.00        |
| 21   | 1,685    | 184          | 157           | 106                       | 67                   | 50            | 35             | 35                    | 100                       | 92               | 133               | Brown        | Brown       | 85.33           | 50.38               | 70.00        |
| 22   | 1,613    | 181          | 145           | 110                       | 68                   | 42            | 36             | 30                    | 95                        | 87               | 132               | Brown        | Brown       | 80.11           | 51.52               | 85.71        |
| 23   | 1,680    | 187          | 151           | 107                       | 68                   | 50            | 33             | 31                    | 100                       | 95               | 135               | Brown        | Brown       | 80.75           | 50.37               | 66.00        |
| 23   | 1,746    | 192          | 148           | 105                       | 65                   | 43            | 33             | 30                    | 99                        | 92               | 136               | —            | —           | 77.08           | 47.80               | 76.74        |
| 23   | 1,694    | 187          | 149           | 102                       | 70                   | 50            | 31             | 30                    | 90                        | 85               | 131               | Brown        | Brown       | 79.68           | 53.44               | 62.00        |
| 24   | 1,667    | 179          | 147           | 107                       | 60                   | 45            | 38             | 30                    | 97                        | 89               | 131               | Brown        | Brown       | 82.12           | 45.80               | 84.44        |
| 25   | 1,592    | 182          | 145           | 103                       | 65                   | 45            | 31             | 29                    | 95                        | 87               | 135               | Black        | Green       | 79.67           | 48.15               | 68.89        |
| 25   | 1,709    | 171          | 148           | 100                       | 62                   | 44            | 32             | 25                    | 90                        | 85               | 130               | Brown        | Brown       | 86.55           | 47.69               | 72.73        |
| 25   | 1,655    | 189          | 150           | 110                       | 65                   | 45            | 30             | 30                    | 100                       | 89               | 133               | Brown        | Hazel       | 79.37           | 48.87               | 66.67        |
| 30   | 1,693    | 180          | 143           | 100                       | 70                   | 58            | 30             | 30                    | 87                        | 82               | 130               | Black        | Hazel       | 79.44           | 53.85               | 51.72        |
| 30   | 1,610    | 169          | 145           | 113                       | 59                   | 40            | 35             | 30                    | 100                       | 88               | 132               | Black        | Brown       | 85.80           | 44.70               | 87.50        |
| 32   | 1,723    | 176          | 150           | 106                       | 60                   | 47            | 39             | 32                    | 100                       | 90               | 135               | Black        | Hazel       | 85.23           | 44.44               | 82.98        |



Group I.—*Miscellaneous.*

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour. | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------|-------------|-----------------|---------------------|--------------|
| 18   | 1,685    | 184          | 150           | 110                       | 70                   | 50            | 34             | 34                    | 102                       | 96               | 136                  | 107               | Black        | Brown       | 81.52           | 51.49               | 68.00        |
| 35   | 1,726    | 184          | 162           | 114                       | 69                   | 52            | 34             | 35                    | 108                       | 100              | 149                  | 108               | Black        | Brown       | 88.04           | 65.38               | 46.32        |
| 22   | 1,772    | 188          | 156           | 116                       | 66                   | 50            | 37             | 36                    | 102                       | 90               | 146                  | 102               | Brown        | Brown       | 82.98           | 45.21               | 74.00        |
| 30   | 1,647    | 183          | 155           | 110                       | 69                   | 51            | 35             | 30                    | 98                        | 92               | 133                  | 101               | Brown        | Green       | 84.70           | 51.88               | 68.63        |
| 40   | 1,635    | 176          | 146           | 100                       | 70                   | 55            | 35             | 32                    | 90                        | 82               | 133                  | 110               | Brown        | Green       | 82.95           | 52.63               | 63.64        |
| 35   | 1,671    | 183          | 153           | 113                       | 67                   | 46            | 41             | 37                    | 100                       | 93               | 138                  | 116               | Medium dark  | Blue        | 83.61           | 58.56               | 89.13        |
| 30   | 1,593    | 185          | 143           | 103                       | 57                   | 41            | 33             | 34                    | 95                        | 90               | 132                  | 107               | Brown        | Green       | 77.30           | 43.18               | 80.49        |
| 35   | 1,647    | 180          | 143           | 103                       | 58                   | 47            | 37             | 28                    | 97                        | 90               | 132                  | 110               | Black        | Brown       | 79.44           | 43.94               | 78.72        |
| 35   | 1,647    | 180          | 143           | 103                       | 58                   | 47            | 37             | 28                    | 97                        | 90               | 132                  | 110               | Black        | Brown       | 79.44           | 43.94               | 78.72        |
| 23   | 1,635    | 181          | 156           | 103                       | 66                   | 47            | 35             | 33                    | 99                        | 93               | 136                  | 98                | Black        | Green       | 80.19           | 58.55               | 74.47        |
| 28   | 1,725    | 188          | 153           | 110                       | 68                   | 52            | 36             | 30                    | 102                       | 95               | 144                  | 114               | Black        | Green       | 81.38           | 47.22               | 69.23        |
| 26   | 1,700    | 168          | 149           | 104                       | 69                   | 45            | 30             | 32                    | 98                        | 93               | 136                  | 104               | Black        | Green       | 88.69           | 50.73               | 66.67        |
| 35   | 1,728    | 190          | 155           | 109                       | 68                   | 54            | 39             | 32                    | 101                       | 93               | 143                  | 107               | Black        | Hazel       | 81.58           | 47.56               | 72.22        |
| 21   | 1,670    | 185          | 151           | 115                       | 60                   | 45            | 32             | 34                    | 102                       | 89               | 139                  | 117               | Brown        | Green       | 81.62           | 43.48               | 71.11        |
| 50   | 1,726    | 176          | 147           | 102                       | 61                   | 46            | 34             | 29                    | 97                        | 89               | 139                  | 117               | White        | Blue        | 83.52           | 43.88               | 73.91        |
| 26   | 1,583    | 179          | 148           | 105                       | 60                   | 50            | 34             | 35                    | 97                        | 90               | 133                  | 103               | Black        | Green       | 82.68           | 45.11               | 68.00        |
| 46   | 1,578    | 183          | 147           | 107                       | 69                   | 51            | 31             | 30                    | 103                       | 95               | 139                  | 103               | Black        | Hazel       | 80.33           | 49.06               | 60.78        |
| 24   | 1,695    | 183          | 150           | 106                       | 62                   | 50            | 37             | 32                    | 104                       | 95               | 138                  | 107               | Brown        | Brown       | 81.97           | 44.93               | 74.00        |
| 25   | 1,676    | 183          | 146           | 101                       | 60                   | 47            | 38             | 30                    | 95                        | 90               | 130                  | 107               | Brown        | Brown       | 75.65           | 46.15               | 80.85        |
| 33   | 1,722    | 188          | 143           | 108                       | 67                   | 48            | 35             | 33                    | 107                       | 100              | 142                  | 120               | Brown        | Brown       | 76.06           | 47.20               | 72.92        |
| 35   | 1,720    | 187          | 152           | 102                       | 66                   | 54            | 33             | 31                    | 104                       | 95               | 141                  | 104               | Light        | Light brown | 81.28           | 46.82               | 61.11        |
| 26   | 1,657    | 175          | 150           | 105                       | 60                   | 47            | 31             | 29                    | 95                        | 90               | 136                  | 108               | Brown        | Brown       | 85.71           | 44.13               | 65.96        |
| 20   | 1,718    | 186          | 162           | 112                       | 65                   | 51            | 34             | 30                    | 100                       | 93               | 140                  | 106               | Brown        | Hazel       | 87.10           | 46.44               | 66.67        |
| 30   | 1,621    | 180          | 137           | 108                       | 67                   | 52            | 29             | 29                    | 99                        | 91               | 132                  | 115               | Brown        | Hazel       | 76.11           | 50.76               | 55.77        |
| 35   | 1,780    | 192          | 140           | 104                       | 70                   | 50            | 37             | 34                    | 99                        | 92               | 140                  | 102               | Black        | Hazel       | 72.92           | 50.00               | 74.00        |
| 35   | 1,626    | 183          | 149           | 108                       | 68                   | 58            | 30             | 30                    | 97                        | 92               | 133                  | 114               | —            | —           | 81.42           | 51.13               | 51.72        |
| 50   | 1,632    | 189          | 137           | 104                       | 67                   | 52            | 35             | 33                    | 100                       | 89               | 137                  | 108               | White        | Brown       | 72.49           | 48.91               | 67.31        |

Group I.—*Miscellaneous—continued.*

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour. | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------|-------------|-----------------|---------------------|--------------|
| 40   | 1,704    | 181          | 143           | 100                       | 68                   | 50            | 38             | 31                    | 97                        | 86               | 135                  | 102               | Brown        | Green       | 79.01           | 50.37               | 76.00        |
| 20   | 1,722    | 180          | 153           | 108                       | 67                   | 55            | 31             | 31                    | 103                       | 87               | 140                  | 107               | Black        | Hazel       | 85.00           | 47.86               | 56.36        |
| 28   | 1,727    | 187          | 150           | 109                       | 73                   | 47            | 37             | 35                    | 105                       | 95               | 141                  | 105               | Black        | Brown       | 80.21           | 51.79               | 78.72        |
| 30   | 1,703    | 184          | 160           | 105                       | 70                   | 52            | 33             | 28                    | 104                       | 91               | 140                  | 110               | Brown        | Brown       | 86.96           | 50.00               | 63.46        |
| 40   | 1,753    | 192          | 136           | 110                       | 70                   | 48            | 40             | 36                    | 105                       | 97               | 134                  | 100               | Brown        | Hazel       | 70.83           | 52.24               | 83.33        |
| 18   | 1,612    | 175          | 147           | 102                       | 64                   | 46            | 33             | 30                    | 94                        | 87               | 125                  | 110               | Brown        | Hazel       | 84.00           | 51.20               | 71.74        |
| 25   | 1,692    | 170          | 143           | 106                       | 67                   | 45            | 31             | 30                    | 103                       | 88               | 133                  | 103               | Brown        | Green       | 79.89           | 50.38               | 68.89        |
| 44   | 1,674    | 185          | 155           | 113                       | 72                   | 49            | 40             | 29                    | 110                       | 100              | 142                  | 111               | Dark         | Green       | 83.78           | 50.71               | 81.63        |
| 33   | 1,612    | 179          | 150           | 109                       | 70                   | 52            | 33             | 30                    | 97                        | 92               | 136                  | 108               | Red          | Blue        | 83.80           | 51.48               | 63.46        |
| 38   | 1,762    | 195          | 150           | 113                       | 70                   | 53            | 39             | 33                    | 107                       | 99               | 147                  | 110               | Black        | Green       | 76.92           | 47.62               | 73.58        |
| 40   | 1,595    | 179          | 147           | 106                       | 67                   | 40            | 33             | 32                    | 93                        | 89               | 134                  | 100               | Brown        | Brown       | 82.12           | 50.00               | 82.50        |
| 50   | 1,747    | 189          | 149           | 108                       | 70                   | 52            | 33             | 33                    | 100                       | 90               | 139                  | 112               | Brown        | Brown       | 78.84           | 50.35               | 63.46        |
| 50   | 1,657    | 186          | 145           | 105                       | 63                   | 50            | 34             | 34                    | 100                       | 92               | 134                  | 109               | Black        | Brown       | 77.96           | 47.01               | 68.00        |
| 45   | 1,617    | 189          | 137           | 109                       | 65                   | 47            | 37             | 34                    | 102                       | 96               | 133                  | 110               | Brown        | Blue        | 72.49           | 48.87               | 78.72        |
| 40   | 1,716    | 184          | 157           | 120                       | 67                   | 49            | 36             | 28                    | 113                       | 100              | 149                  | 101               | Black        | Brown       | 85.33           | 44.97               | 73.47        |
| 35   | 1,742    | 191          | 156           | 118                       | 68                   | 48            | 41             | 35                    | 107                       | 97               | 147                  | 115               | Black        | Brown       | 81.68           | 46.28               | 85.42        |
| 50   | 1,680    | 178          | 152           | 105                       | 78                   | 56            | 38             | 28                    | 103                       | 88               | 142                  | 101               | Dark         | Hazel       | 85.39           | 54.96               | 67.86        |
| 60   | 1,615    | 188          | 148           | 105                       | 80                   | 58            | 38             | 31                    | 108                       | 82               | 138                  | 100               | White        | Brown       | 78.72           | 58.00               | 65.52        |
| 60   | 1,615    | 189          | 145           | 105                       | 64                   | 50            | 36             | 28                    | 107                       | 86               | 137                  | 111               | White        | Brown       | 76.72           | 46.74               | 72.00        |
| 60   | 1,650    | 183          | 145           | 105                       | 66                   | 53            | 31             | 29                    | 104                       | 83               | 132                  | 97                | White        | Green       | 79.23           | 50.00               | 58.49        |
| 65   | 1,458    | 172          | 144           | 105                       | 59                   | 52            | 36             | 28                    | 98                        | 78               | 134                  | 104               | White        | Green       | 83.72           | 44.03               | 69.23        |
| 60   | 1,618    | 175          | 143           | 105                       | 77                   | 50            | 35             | 34                    | 97                        | 79               | 132                  | 100               | Black        | Blue        | 81.71           | 58.33               | 70.00        |
| 21   | 1,739    | 186          | 151           | 110                       | 70                   | 49            | 38             | 30                    | 105                       | 95               | 135                  | 115               | Black brown  | Hazel       | 81.18           | 51.85               | 77.55        |
| 25   | 1,601    | 174          | 149           | 104                       | 64                   | 47            | 33             | 30                    | 102                       | 88               | 139                  | 109               | Black        | Blue        | 85.63           | 46.06               | 70.21        |
| 18   | 1,614    | 186          | 145           | 104                       | 67                   | 47            | 30             | 29                    | 100                       | 90               | 133                  | 107               | Brown        | Hazel       | 77.96           | 50.38               | 63.83        |
| 19   | 1,597    | 179          | 143           | 110                       | 65                   | 48            | 32             | 31                    | 99                        | 92               | 135                  | 109               | Brown        | Hazel       | 79.89           | 48.15               | 66.67        |



Group I.—*Miscellaneous*—continued.

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour.       | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------------|-------------|-----------------|---------------------|--------------|
| 18   | 1,604    | 177          | 139           | 107                       | 69                   | 51            | 32             | 29                    | 89                        | 86               | 121                  | 91                | Black              | Brown       | 78.53           | 57.02               | 62.75        |
| 20   | 1,663    | 189          | 147           | 109                       | 70                   | 50            | 32             | 31                    | 102                       | 95               | 136                  | 110               | Fair               | Blue        | 77.78           | 51.49               | 64.00        |
| 22   | 1,628    | 182          | 151           | 108                       | 68                   | 51            | 37             | 29                    | 97                        | 92               | 137                  | 110               | Black              | Hazel       | 82.97           | 49.64               | 72.55        |
| 19   | 1,593    | 171          | 145           | 105                       | 65                   | 50            | 31             | 31                    | 93                        | 89               | 131                  | 103               | Black              | Hazel       | 84.80           | 49.62               | 72.00        |
| 30   | 1,640    | 175          | 143           | 110                       | 68                   | 49            | 33             | 29                    | 105                       | 91               | 139                  | 112               | —                  | —           | 81.71           | 48.91               | 67.35        |
| —    | 1,697    | 193          | 143           | 111                       | 72                   | 51            | 35             | 35                    | 109                       | 95               | 138                  | 111               | Black              | Blue        | 74.09           | 52.19               | 68.63        |
| 18   | 1,584    | 177          | 135           | 102                       | 70                   | 50            | 31             | 27                    | 90                        | 85               | 122                  | 100               | Brown              | Brown       | 76.27           | 57.38               | 62.00        |
| 27   | 1,717    | 195          | 157           | 120                       | 71                   | 52            | 37             | 36                    | 109                       | 105              | 149                  | 114               | Brown              | Hazel       | 80.51           | 47.65               | 71.15        |
| 20   | 1,625    | 173          | 151           | 115                       | 70                   | 56            | 32             | 31                    | 103                       | 92               | 136                  | 120               | Brown              | Brown       | 87.28           | 51.48               | 57.14        |
| 30   | 1,752    | 178          | 148           | 102                       | 65                   | 50            | 33             | 33                    | 98                        | 90               | 136                  | 110               | Brown              | Brown       | 83.15           | 47.80               | 66.00        |
| 35   | 1,655    | 177          | 148           | 110                       | 64                   | 47            | 38             | 30                    | 100                       | 95               | 135                  | 107               | Brown              | Brown       | 83.62           | 47.41               | 80.85        |
| 48   | 1,777    | 190          | 180           | 113                       | 75                   | 55            | 35             | 33                    | 100                       | 90               | 132                  | 118               | White              | Blue        | 84.21           | 56.82               | 63.64        |
| 19   | 1,723    | 189          | 164           | 120                       | 68                   | 51            | 36             | 31                    | 109                       | 100              | 146                  | 125               | Brown              | Blue        | 86.77           | 47.06               | 70.59        |
| 18   | 1,707    | 173          | 158           | 113                       | 71                   | 57            | 32             | 32                    | 109                       | 96               | 137                  | 116               | Brown              | Green       | 91.33           | 51.84               | 56.14        |
| 20   | 1,740    | 187          | 166           | 112                       | 70                   | 55            | 33             | 29                    | 100                       | 91               | 142                  | 113               | Brown              | Green       | 88.77           | 49.30               | 60.00        |
| 25   | 1,750    | 185          | 157           | 96                        | 69                   | 55            | 41             | 37                    | 106                       | 97               | 146                  | 119               | Brown              | Brown       | 84.86           | 52.27               | 74.55        |
| 20   | 1,714    | 179          | 152           | 116                       | 73                   | 54            | 30             | 30                    | 106                       | 103              | 141                  | 108               | Black              | Blue        | 84.92           | 51.78               | 55.56        |
| 45   | 1,595    | 181          | 153           | 97                        | 67                   | 45            | 38             | 33                    | 89                        | 83               | 133                  | 103               | Black, going white | Brown       | 84.53           | 50.38               | 84.44        |

Group 11.—*Lapethos* ♂.

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour. | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------|-------------|-----------------|---------------------|--------------|
| 45   | 1,593    | 190          | 159           | 119                       | 69                   | 53            | 37             | 37                    | 115                       | 100              | 144                  | 115               | Black        | Brown       | 83.68           | 47.95               | 69.81        |
| 70   | 1,571    | 177          | 145           | 101                       | 65                   | 47            | 40             | 29                    | 97                        | 87               | 131                  | 105               | White        | Green       | 81.92           | 49.62               | 85.11        |
| 31   | 1,669    | 177          | 153           | 109                       | 70                   | 52            | 38             | 30                    | 102                       | 92               | 137                  | 102               | Brown        | Blue        | 86.44           | 51.11               | 73.08        |
| 45   | 1,672    | 179          | 155           | 113                       | 74                   | 57            | 35             | 30                    | 105                       | 91               | 140                  | 105               | Black        | Brown       | 86.59           | 52.87               | 61.40        |
| 68   | 1,620    | 190          | 135           | 103                       | 64                   | 52            | 33             | 30                    | 91                        | 86               | 131                  | 115               | White        | Blue        | 71.05           | 48.85               | 63.46        |
| 80   | 1,533    | 172          | 149           | 110                       | 65                   | 50            | 38             | 30                    | 100                       | 90               | 140                  | 110               | White        | Hazel       | 86.63           | 46.44               | 76.00        |
| 50   | 1,664    | 186          | 153           | 106                       | 64                   | 50            | 33             | 29                    | 103                       | 93               | 141                  | 105               | Grey         | Hazel       | 82.26           | 45.40               | 66.00        |
| 60   | 1,682    | 179          | 150           | 107                       | 66                   | 50            | 37             | 30                    | 107                       | 90               | 145                  | 110               | White        | Hazel       | 83.80           | 45.52               | 74.00        |
| 65   | 1,704    | 190          | 153           | 109                       | 70                   | 55            | 37             | 31                    | 97                        | 90               | 140                  | 113               | White        | Brown       | 80.53           | 50.00               | 67.27        |
| 22   | 1,650    | 173          | 146           | 107                       | 63                   | 47            | 32             | 28                    | 97                        | 91               | 133                  | 101               | Black        | Brown       | 84.39           | 47.37               | 68.09        |
| 50   | 1,679    | 177          | 145           | 100                       | 67                   | 52            | 39             | 30                    | 95                        | 85               | 137                  | 116               | White        | Green       | 81.92           | 48.90               | 75.00        |
| 20   | 1,728    | 175          | 155           | 120                       | 67                   | 52            | 35             | 32                    | 110                       | 96               | 140                  | 110               | Brown        | Brown       | 88.57           | 47.86               | 67.31        |
| 26   | 1,635    | 185          | 163           | 108                       | 64                   | 48            | 38             | 34                    | 105                       | 90               | 140                  | 101               | Brown        | Brown       | 88.11           | 45.72               | 79.17        |
| 57   | 1,670    | 180          | 149           | 109                       | 66                   | 52            | 38             | 37                    | 106                       | 91               | 140                  | 110               | White        | Green       | 82.78           | 47.15               | 73.08        |
| 48   | 1,694    | 186          | 150           | 110                       | 60                   | 49            | 36             | 36                    | 103                       | 93               | 145                  | 110               | White        | Green       | 80.65           | 41.40               | 73.47        |
| 45   | 1,550    | 177          | 150           | 112                       | 63                   | 46            | 32             | 38                    | 108                       | 100              | 141                  | 103               | Black        | Green       | 84.75           | 46.69               | 69.57        |
| 21   | 1,702    | 172          | 148           | 105                       | 60                   | 45            | 34             | 33                    | 104                       | 91               | 134                  | 104               | Black        | Brown       | 86.05           | 44.78               | 75.56        |
| 19   | 1,550    | 183          | 150           | 107                       | 63                   | 50            | 37             | 31                    | 100                       | 88               | 135                  | 100               | Brown        | Brown       | 81.97           | 46.67               | 74.00        |
| 19   | 1,603    | 178          | 156           | 117                       | 67                   | 49            | 36             | 36                    | 109                       | 97               | 140                  | 107               | Brown        | Brown       | 87.64           | 47.86               | 73.47        |
| 50   | 1,674    | 188          | 143           | 109                       | 63                   | 45            | 35             | 30                    | 101                       | 90               | 137                  | 101               | Brown        | Hazel       | 78.06           | 46.00               | 77.78        |
| 32   | 1,690    | 192          | 151           | 110                       | 67                   | 52            | 41             | 34                    | 105                       | 100              | 141                  | 113               | Black        | Brown       | 78.65           | 47.52               | 78.85        |
| 19   | 1,722    | 177          | 150           | 110                       | 69                   | 49            | 35             | 31                    | 106                       | 91               | 137                  | 115               | Black        | Brown       | 84.75           | 50.35               | 71.43        |
| 40   | 1,802    | 177          | 150           | 110                       | 72                   | 53            | 36             | 36                    | 110                       | 100              | 145                  | 117               | Black        | Brown       | 84.75           | 49.66               | 67.92        |
| 30   | 1,728    | 196          | 155           | 102                       | 73                   | 52            | 36             | 32                    | 106                       | 100              | 146                  | 110               | Black        | Brown       | 79.08           | 50.00               | 69.23        |
| 59   | 1,576    | 180          | 150           | 103                       | 66                   | 50            | 37             | 30                    | 95                        | 90               | 134                  | 100               | White        | Blue        | 83.33           | 49.25               | 74.00        |
| 32   | 1,735    | 181          | 149           | 105                       | 75                   | 53            | 30             | 30                    | 106                       | 100              | 141                  | 111               | Black        | Brown       | 82.32           | 53.20               | 56.60        |



Group 11.—*Lapethos* ♂—continued.

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour. | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------|-------------|-----------------|---------------------|--------------|
| 40   | 1,645    | 182          | 155           | 119                       | 69                   | 54            | 36             | 33                    | 114                       | 98               | 143                  | 114               | White        | Brown       | 85.16           | 48.25               | 66.67        |
| 35   | 1,743    | 182          | 153           | 112                       | 78                   | 50            | 36             | 33                    | 110                       | 98               | 145                  | 121               | Black-white  | Brown       | 84.07           | 53.80               | 72.00        |
| 32   | 1,623    | 175          | 145           | 102                       | 60                   | 46            | 38             | 29                    | 96                        | 90               | 130                  | 107               | Black        | Brown       | 82.86           | 46.15               | 82.61        |
| 30   | 1,650    | 170          | 150           | 105                       | 62                   | 50            | 34             | 29                    | 100                       | 90               | 133                  | 102               | —            | —           | 88.24           | 46.62               | 68.00        |
| 22   | 1,672    | 178          | 149           | 102                       | 62                   | 46            | 34             | 31                    | 94                        | 89               | 132                  | 110               | Black        | Hazel       | 83.71           | 46.97               | 73.91        |
| 27   | 1,720    | 188          | 147           | 110                       | 64                   | 46            | 36             | 36                    | 102                       | 97               | 143                  | 118               | Black        | Hazel       | 78.19           | 44.75               | 78.26        |
| 25   | 1,686    | 183          | 147           | 111                       | 65                   | 50            | 36             | 35                    | 107                       | 95               | 139                  | 110               | Brown        | Blue        | 80.33           | 46.75               | 72.00        |
| 18   | 1,584    | 177          | 150           | 110                       | 70                   | 54            | 33             | 33                    | 101                       | 95               | 139                  | 101               | Brown        | Brown       | 84.75           | 50.35               | 61.11        |
| 25   | 1,663    | 178          | 156           | 108                       | 58                   | 46            | 33             | 30                    | 100                       | 91               | 131                  | 108               | Brown        | Brown       | 87.64           | 44.27               | 71.74        |
| 32   | 1,683    | 182          | 154           | 108                       | 63                   | 46            | 33             | 33                    | 100                       | 93               | 135                  | 110               | Black        | Brown       | 84.62           | 46.67               | 71.74        |
| 22   | 1,727    | 180          | 156           | 115                       | 66                   | 50            | 33             | 30                    | 107                       | 96               | 137                  | 107               | Black        | Hazel       | 86.67           | 48.19               | 66.00        |
| 45   | 1,754    | 192          | 161           | 107                       | 70                   | 50            | 38             | 30                    | 97                        | 90               | 136                  | 110               | White        | Green       | 83.85           | 51.48               | 76.00        |
| 30   | 1,674    | 182          | 149           | 110                       | 63                   | 52            | 34             | 35                    | 103                       | 95               | 135                  | 115               | Brown        | Hazel       | 81.87           | 46.67               | 65.38        |
| 21   | 1,733    | 200          | 151           | 121                       | 76                   | 58            | 40             | 39                    | 114                       | 107              | 150                  | 123               | Brown        | Brown       | 75.50           | 50.67               | 68.97        |
| 35   | 1,660    | 186          | 152           | 110                       | 64                   | 45            | 33             | 30                    | 103                       | 92               | 139                  | 103               | Black-white  | Hazel       | 81.72           | 46.05               | 73.33        |
| 27   | 1,635    | 183          | 151           | 114                       | 64                   | 42            | 40             | 29                    | 103                       | 95               | 141                  | 117               | Black        | Brown       | 82.51           | 45.40               | 95.24        |
| 60   | 1,702    | 189          | 147           | 100                       | 68                   | 58            | 33             | 33                    | 100                       | 90               | 139                  | 108               | White        | Green       | 77.78           | 48.95               | 56.90        |
| 37   | 1,536    | 179          | 145           | 105                       | 65                   | 50            | 33             | 31                    | 101                       | 87               | 137                  | 110               | Black        | Brown       | 82.68           | 47.45               | 66.00        |
| 38   | 1,772    | 185          | 155           | 110                       | 69                   | 50            | 31             | 25                    | 107                       | 90               | 145                  | 121               | Black        | Brown       | 83.78           | 47.60               | 62.00        |
| 31   | 1,707    | 182          | 148           | 100                       | 72                   | 50            | 33             | 30                    | 100                       | 92               | 137                  | 110               | Brown        | Brown       | 81.32           | 52.54               | 66.00        |
| 42   | 1,707    | 175          | 147           | 103                       | 75                   | 52            | 36             | 30                    | 97                        | 88               | 136                  | 104               | Black        | Hazel       | 84.00           | 55.15               | 69.23        |
| 30   | 1,657    | 182          | 158           | 108                       | 64                   | 48            | 34             | 30                    | 97                        | 89               | 136                  | 111               | Brown        | Blue        | 86.81           | 47.06               | 70.83        |
| 69   | 1,737    | 197          | 147           | 106                       | 70                   | 56            | 36             | 31                    | 101                       | 91               | 140                  | 113               | Black        | Hazel       | 74.62           | 50.00               | 64.29        |
| 38   | 1,874    | 185          | 153           | 103                       | 73                   | 57            | 28             | 28                    | 102                       | 90               | 139                  | 120               | Black        | Brown       | 82.70           | 52.52               | 49.12        |
| 28   | 1,723    | 177          | 153           | 107                       | 63                   | 50            | 36             | 32                    | 98                        | 90               | 135                  | 110               | Brown        | Brown       | 86.44           | 46.67               | 72.00        |
| 39   | 1,723    | 187          | 153           | 107                       | 71                   | 50            | 35             | 35                    | 105                       | 94               | 140                  | 105               | Black        | Brown       | 81.82           | 50.70               | 70.00        |

Group II.—*Lapethos* ♂—continued.

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour.       | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------------|-------------|-----------------|---------------------|--------------|
| 36   | 1,800    | 196          | 153           | 106                       | 73                   | 60            | 34             | 33                    | 101                       | 91               | 140                  | 115               | Black              | Green       | 78.06           | 52.15               | 56.07        |
| 32   | 1,896    | 181          | 145           | 103                       | 70                   | 46            | 35             | 30                    | 96                        | 90               | 135                  | 106               | Brown              | —           | 80.11           | 51.85               | 76.09        |
| 60   | 1,804    | 183          | 149           | 107                       | 76                   | 53            | 37             | 36                    | 108                       | 90               | 141                  | 112               | White              | Hazel       | 81.42           | 53.89               | 68.91        |
| 27   | 1,832    | 177          | 163           | 115                       | 67                   | 50            | 30             | 35                    | 113                       | 95               | 153                  | 121               | Black              | Brown       | 92.09           | 43.80               | 60.00        |
| 45   | 1,847    | 186          | 158           | 110                       | 71                   | 51            | 35             | 35                    | 117                       | 105              | 147                  | 119               | Black              | Hazel       | 83.87           | 48.30               | 68.63        |
| 52   | 1,697    | 180          | 147           | 102                       | 67                   | 53            | 35             | 31                    | 103                       | 93               | 141                  | 103               | Black to white     | Dark green  | 81.67           | 47.55               | 66.04        |
| 45   | 1,678    | 187          | 151           | 110                       | 60                   | 43            | 37             | 37                    | 108                       | 97               | 140                  | 119               | Black              | Hazel       | 80.75           | 42.85               | 86.05        |
| 43   | 1,678    | 180          | 147           | 100                       | 71                   | 55            | 42             | 30                    | 100                       | 91               | 138                  | 117               | Black              | Green       | 81.67           | 51.47               | 80.77        |
| 65   | 1,722    | 185          | 157           | 120                       | 70                   | 51            | 36             | 32                    | 115                       | 100              | 148                  | 116               | White (once black) | Brown       | 84.86           | 47.31               | 69.23        |
| 31   | 1,687    | 175          | 149           | 103                       | 71                   | 51            | 33             | 29                    | 99                        | 89               | 129                  | 110               | Brown              | Green       | 85.14           | 53.04               | 64.71        |
| 50   | 1,721    | 183          | 153           | 113                       | 67                   | 51            | 39             | 32                    | 105                       | 92               | 142                  | 113               | Brown              | Blue        | 83.61           | 47.20               | 76.47        |
| 18   | 1,657    | 179          | 145           | 105                       | 60                   | 43            | 31             | 28                    | 89                        | 83               | 135                  | 100               | Brown              | Green       | 81.01           | 44.44               | 72.09        |
| 32   | 1,650    | 171          | 149           | 103                       | 68                   | 52            | 32             | 31                    | 105                       | 89               | 136                  | 105               | Black to white     | Hazel       | 87.13           | 50.00               | 61.54        |
| 22   | 1,641    | 192          | 155           | 108                       | 74                   | 59            | 35             | 33                    | 102                       | 96               | 140                  | 115               | Medium dark        | Hazel       | 80.73           | 52.87               | 59.32        |
| 24   | 1,670    | 187          | 151           | 113                       | 75                   | 60            | 32             | 32                    | 110                       | 102              | 135                  | 110               | Black              | Brown       | 80.75           | 55.56               | 53.33        |
| 20   | 1,696    | 189          | 153           | 113                       | 63                   | 50            | 32             | 35                    | 101                       | 95               | 139                  | 113               | Brown              | Brown       | 80.95           | 45.35               | 64.00        |
| 40   | 1,736    | 182          | 149           | 113                       | 69                   | 52            | 37             | 35                    | 104                       | 96               | 144                  | 112               | Black              | Green       | 81.87           | 47.95               | 71.15        |
| 32   | 1,633    | 185          | 142           | 105                       | 71                   | 58            | 36             | 31                    | 101                       | 90               | 135                  | 111               | Brown              | Brown       | 76.76           | 52.59               | 62.07        |
| 21   | 1,719    | 195          | 160           | 113                       | 62                   | 43            | 35             | 35                    | 109                       | 95               | 147                  | 109               | Black and brown    | Light green | 82.05           | 42.18               | 81.40        |
| 38   | 1,723    | 185          | 150           | 110                       | 60                   | 48            | 41             | 35                    | 107                       | 95               | 143                  | 116               | Black              | Brown       | 81.08           | 41.95               | 85.42        |
| 40   | 1,703    | 199          | 145           | 109                       | 69                   | 49            | 37             | 35                    | 109                       | 98               | 137                  | 109               | Brown              | Brown       | 72.86           | 50.40               | 75.51        |
| 61   | 1,667    | 191          | 150           | 116                       | 69                   | 49            | 33             | 30                    | 109                       | 97               | 143                  | 113               | Black to white     | Brown       | 78.53           | 48.28               | 67.35        |



Group 11.—*Lapethos* ♂—continued.

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour.       | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------------|-------------|-----------------|---------------------|--------------|
| 19   | 1,683    | 168          | 153           | 107                       | 60                   | 46            | 31             | 30                    | 106                       | 85               | 130                  | 106               | Brown              | Green       | 91.07           | 46.15               | 67.35        |
| 35   | 1,680    | 191          | 148           | 104                       | 72                   | 50            | 34             | 28                    | 100                       | 90               | 130                  | 109               | Black              | Brown       | 77.49           | 55.38               | 68.00        |
| 30   | 1,647    | 167          | 155           | 110                       | 65                   | 47            | 29             | 33                    | 106                       | 90               | 137                  | 113               | Brown              | Hazel       | 92.81           | 47.45               | 61.70        |
| 22   | 1,770    | 185          | 155           | 116                       | 70                   | 50            | 30             | 32                    | 113                       | 100              | 143                  | 112               | Brown              | Hazel       | 83.78           | 48.95               | 60.00        |
| 47   | 1,713    | 185          | 148           | 107                       | 77                   | 53            | 33             | 30                    | 107                       | 97               | 142                  | 123               | Black to white     | Green       | 80.00           | 54.23               | 62.26        |
| 33   | 1,677    | 185          | 145           | 107                       | 72                   | 44            | 30             | 29                    | 104                       | 90               | 135                  | 104               | Brown              | Hazel       | 78.38           | 53.33               | 68.18        |
| 43   | 1,662    | 185          | 149           | 100                       | 62                   | 43            | 35             | 30                    | 103                       | 89               | 137                  | 103               | Black              | Hazel       | 80.54           | 45.26               | 81.40        |
| 30   | 1,676    | 186          | 153           | 123                       | 65                   | 54            | 30             | 33                    | 117                       | 103              | 147                  | 115               | Black              | Brown       | 82.26           | 44.22               | 55.56        |
| 42   | 1,642    | 183          | 143           | 106                       | 70                   | 47            | 30             | 30                    | 103                       | 90               | 139                  | 106               | Black to white     | Brown       | 78.14           | 50.35               | 63.83        |
| 20   | 1,708    | 183          | 151           | 105                       | 67                   | 48            | 32             | 29                    | 95                        | 90               | 133                  | 109               | Brown              | Hazel       | 82.51           | 50.38               | 66.67        |
| 46   | 1,720    | 191          | 150           | 107                       | 68                   | 47            | 35             | 30                    | 103                       | 91               | 145                  | 116               | Black to white     | Brown       | 78.53           | 46.90               | 74.47        |
| 36   | 1,710    | 187          | 149           | 110                       | 62                   | 46            | 36             | 31                    | 105                       | 92               | 139                  | 105               | Brown              | Blue        | 79.08           | 44.62               | 78.26        |
| 47   | 1,650    | 186          | 139           | 107                       | 67                   | 49            | 37             | 33                    | 106                       | 90               | 139                  | 111               | Brown              | Green       | 74.73           | 43.20               | 75.51        |
| 35   | 1,723    | 189          | 154           | 108                       | 63                   | 46            | 40             | 35                    | 109                       | 100              | 144                  | 115               | Black to white     | Brown       | 81.48           | 43.75               | 86.96        |
| 53   | 1,670    | 193          | 142           | 105                       | 75                   | 54            | 33             | 33                    | 102                       | 95               | 133                  | 109               | Black, white beard | Brown       | 73.58           | 56.39               | 61.11        |
| 23   | 1,627    | 176          | 155           | 112                       | 62                   | 49            | 34             | 31                    | 106                       | 97               | 139                  | 112               | Brown              | Green       | 88.07           | 44.61               | 69.39        |
| 26   | 1,721    | 185          | 140           | 103                       | 70                   | 53            | 31             | 31                    | 103                       | 91               | 125                  | 103               | Black              | Brown       | 75.68           | 56.00               | 58.49        |
| 46   | 1,679    | 190          | 151           | 105                       | 70                   | 48            | 34             | 35                    | 110                       | 97               | 142                  | 110               | Black to white     | Green       | 79.47           | 49.29               | 70.83        |
| 36   | 1,650    | 167          | 147           | 103                       | 63                   | 52            | 32             | 30                    | 102                       | 90               | 135                  | 110               | Brown              | Green       | 88.02           | 46.67               | 61.54        |
| 22   | 1,697    | 172          | 145           | 100                       | 70                   | 53            | 33             | 30                    | 90                        | 85               | 129                  | 106               | Brown              | Hazel       | 84.30           | 54.26               | 62.26        |
| 30   | 1,772    | 194          | 150           | 110                       | 70                   | 50            | 41             | 33                    | 115                       | 100              | 143                  | 115               | Brown              | Hazel       | 77.32           | 48.95               | 82.00        |

Group II.—*Lapethos* ♂—continued.

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour.   | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|----------------|-------------|-----------------|---------------------|--------------|
| 25   | 1,682    | 176          | 156           | 109                       | 62                   | 47            | 40             | 33                    | 101                       | 90               | 142                  | 109               | Brown          | Hazel       | 88.64           | 43.67               | 85.11        |
| 32   | 1,697    | 192          | 151           | 107                       | 70                   | 48            | 33             | 30                    | 101                       | 89               | 139                  | 113               | Brown          | Blue        | 78.65           | 50.39               | 68.75        |
| 30   | 1,627    | 182          | 150           | 110                       | 70                   | 47            | 33             | 33                    | 105                       | 97               | 142                  | 115               | Black          | Brown       | 82.42           | 49.30               | 70.21        |
| 45   | 1,760    | 193          | 162           | 116                       | 70                   | 49            | 40             | 34                    | 108                       | 98               | 150                  | 123               | White          | Green       | 83.94           | 46.67               | 81.63        |
| 45   | 1,740    | 185          | 153           | 110                       | 68                   | 49            | 35             | 32                    | 106                       | 93               | 140                  | 116               | Brown          | Hazel       | 82.70           | 48.55               | 71.43        |
| 54   | 1,617    | 170          | 153           | 101                       | 68                   | 48            | 35             | 33                    | 95                        | 89               | 133                  | 106               | Brown          | Light blue  | 90.00           | 51.13               | 72.92        |
| 33   | 1,608    | 190          | 147           | 105                       | 67                   | 47            | 36             | 32                    | 98                        | 92               | 143                  | 107               | Black          | Green       | 77.37           | 46.85               | 76.00        |
| 50   | 1,648    | 190          | 153           | 106                       | 73                   | 51            | 33             | 32                    | 102                       | 95               | 139                  | 113               | White          | Brown       | 80.53           | 52.52               | 57.89        |
| 48   | 1,788    | 190          | 153           | 110                       | 78                   | 56            | 32             | 31                    | 110                       | 95               | 137                  | 110               | White          | Hazel       | 80.53           | 56.93               | 57.14        |
| 28   | 1,774    | 192          | 149           | 110                       | 80                   | 59            | 31             | 34                    | 105                       | 93               | 140                  | 110               | Brown          | Brown       | 77.60           | 57.65               | 52.54        |
| 26   | 1,690    | 185          | 141           | 100                       | 64                   | 45            | 32             | 29                    | 97                        | 89               | 133                  | 106               | Black          | Brown       | 76.22           | 48.12               | 71.11        |
| 38   | 1,730    | 191          | 160           | 115                       | 69                   | 50            | 37             | 34                    | 115                       | 107              | 150                  | 125               | Black          | Hazel       | 83.77           | 46.00               | 74.00        |
| 58   | 1,611    | 185          | 143           | 103                       | 71                   | 52            | 29             | 32                    | 100                       | 90               | 136                  | 103               | Black to white | Green       | 77.30           | 52.20               | 55.77        |
| 50?  | 1,652    | 167          | 141           | 100                       | 64                   | 51            | 32             | 29                    | 91                        | 86               | 129                  | 100               | White          | Hazel       | 84.43           | 49.61               | 62.75        |
| 43   | 1,720    | 182          | 152           | 110                       | 70                   | 52            | 38             | 32                    | 100                       | 94               | 137                  | 115               | White          | Hazel       | 83.52           | 51.10               | 73.08        |
| 21   | 1,730    | 178          | 146           | 105                       | 70                   | 51            | 30             | 29                    | 103                       | 90               | 140                  | 119               | Brown          | Brown       | 82.02           | 50.00               | 58.82        |
| 27   | 1,660    | 180          | 153           | 111                       | 62                   | 38            | 33             | 33                    | 110                       | 95               | 141                  | 110               | Brown          | Brown       | 85.00           | 43.96               | 86.84        |
| 60   | 1,678    | 195          | 148           | 107                       | 67                   | 50            | 33             | 33                    | 102                       | 95               | 135                  | 100               | White          | Brown       | 75.90           | 49.63               | 66.00        |
| 45   | 1,674    | 183          | 153           | 107                       | 63                   | 47            | 38             | 30                    | 105                       | 90               | 137                  | 105               | Black          | Green       | 83.61           | 46.00               | 80.85        |
| 30   | 1,728    | 178          | 147           | 110                       | 69                   | 53            | 30             | 30                    | 98                        | 89               | 135                  | 106               | Brown          | Brown       | 82.58           | 51.11               | 55.56        |
| 27   | 1,722    | 172          | 155           | 107                       | 70                   | 55            | 30             | 31                    | 100                       | 90               | 139                  | 120               | Medium dark    | Blue        | 90.12           | 50.35               | 54.35        |
| 20   | 1,661    | 182          | 153           | 109                       | 73                   | 50            | 35             | 30                    | 100                       | 95               | 140                  | 107               | —              | —           | 84.07           | 52.15               | 70.00        |
| 18   | 1,596    | 171          | 142           | 100                       | 62                   | 40            | 34             | 32                    | 99                        | 87               | 125                  | 103               | Black          | Brown       | 83.00           | 49.60               | 85.00        |



Group II.—*Karawas.*

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour.       | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------------|-------------|-----------------|---------------------|--------------|
| 28   | 1,657    | 170          | 154           | 110                       | 63                   | 47            | 33             | 29                    | 111                       | 91               | 140                  | 111               | Brown              | Brown       | 90.59           | 45.03               | 70.21        |
| 18   | 1,671    | 176          | 138           | 108                       | 60                   | 40            | 28             | 30                    | 97                        | 92               | 135                  | 101               | Brown              | Brown       | 78.41           | 44.44               | 70.00        |
| 20   | 1,633    | 193          | 150           | 123                       | 69                   | 56            | 35             | 33                    | 92                        | 85               | 139                  | 111               | Black              | Brown       | 77.72           | 49.65               | 62.50        |
| 18   | 1,637    | 179          | 147           | 110                       | 57                   | 44            | 36             | 29                    | 97                        | 89               | 130                  | 101               | Brown              | Hazel       | 82.12           | 43.85               | 81.82        |
| 20   | 1,673    | 179          | 151           | 111                       | 64                   | 49            | 33             | 31                    | 97                        | 90               | 137                  | 107               | Brown              | Hazel       | 84.36           | 46.75               | 67.35        |
| 23   | 1,654    | 182          | 144           | 108                       | 69                   | 56            | 36             | 33                    | 97                        | 92               | 138                  | 114               | Brown              | Green       | 79.12           | 50.00               | 64.29        |
| 27   | 1,644    | 184          | 148           | 104                       | 66                   | 50            | 32             | 28                    | 93                        | 83               | 137                  | 103               | Brown              | Green       | 80.43           | 48.15               | 64.00        |
| 18   | 1,662    | 183          | 153           | 120                       | 71                   | 51            | 35             | 37                    | 109                       | 103              | 149                  | 113               | Brown              | Brown       | 83.61           | 47.65               | 68.63        |
| 20   | 1,634    | 181          | 150           | 109                       | 69                   | 49            | 30             | 30                    | 97                        | 92               | 141                  | 109               | Brown              | Green       | 82.87           | 48.95               | 61.22        |
| 19   | 1,650    | 180          | 142           | 110                       | 67                   | 47            | 29             | 29                    | 99                        | 90               | 133                  | 110               | Light brown        | Green       | 78.89           | 50.38               | 61.70        |
| 50   | 1,717    | 185          | 135           | 105                       | 71                   | 50            | 38             | 30                    | 95                        | 85               | 138                  | 119               | White              | Green       | 72.97           | 51.48               | 76.00        |
| 24   | 1,665    | 194          | 145           | 112                       | 66                   | 49            | 35             | 30                    | 100                       | 92               | 140                  | 106               | Black              | Brown       | 74.74           | 47.15               | 71.43        |
| 30   | 1,777    | 189          | 153           | 113                       | 69                   | 53            | 40             | 38                    | 105                       | 95               | 141                  | 110               | Black              | Brown       | 80.95           | 48.95               | 75.47        |
| 24   | 1,746    | 185          | 141           | 110                       | 67                   | 57            | 30             | 27                    | 97                        | 88               | 137                  | 117               | Brown              | Light brown | 76.22           | 58.91               | 52.63        |
| 20   | 1,644    | 188          | 152           | 106                       | 65                   | 48            | 39             | 29                    | 94                        | 89               | 131                  | 107               | Brown              | Brown       | 80.85           | 49.62               | 81.25        |
| 28   | 1,650    | 190          | 155           | 110                       | 66                   | 49            | 36             | 36                    | 103                       | 97               | 139                  | 103               | Brown              | Brown       | 81.58           | 47.45               | 73.47        |
| 50   | 1,700    | 183          | 139           | 111                       | 68                   | 47            | 34             | 31                    | 102                       | 95               | 137                  | 119               | White              | Brown       | 75.96           | 49.54               | 72.34        |
| 30   | 1,707    | 182          | 145           | 107                       | 67                   | 49            | 35             | 31                    | 95                        | 90               | 134                  | 107               | Brown              | Green       | 79.67           | 50.00               | 71.43        |
| 62   | 1,702    | 183          | 149           | 113                       | 67                   | 47            | 37             | 35                    | 110                       | 93               | 145                  | 110               | Black, going white | Brown       | 81.42           | 46.20               | 78.72        |
| 50   | 1,701    | 195          | 139           | 100                       | 67                   | 44            | 40             | 30                    | 96                        | 89               | 133                  | 105               | Black, going white | Green       | 71.28           | 50.38               | 90.91        |
| 30   | 1,671    | 185          | 148           | 111                       | 69                   | 54            | 33             | 33                    | 96                        | 91               | 137                  | 119               | Black              | Brown       | 80.00           | 50.39               | 61.11        |
| 19   | 1,661    | 184          | 150           | 109                       | 62                   | 48            | 32             | 33                    | 97                        | 92               | 136                  | 99                | Black              | Brown       | 81.52           | 45.57               | 66.67        |
| 20   | 1,722    | 178          | 145           | 106                       | 67                   | 47            | 33             | 30                    | 99                        | 89               | 137                  | 109               | Brown              | Brown       | 81.46           | 48.92               | 70.21        |
| 20   | 1,696    | 184          | 153           | 115                       | 62                   | 46            | 34             | 33                    | 99                        | 95               | 143                  | 109               | Black              | Brown       | 83.15           | 43.47               | 73.91        |

Group II.—*Karavas*—continued.

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour.         | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|----------------------|-------------|-----------------|---------------------|--------------|
| 20   | 1,667    | 192          | 151           | 116                       | 71                   | 52            | 35             | 32                    | 98                        | 92               | 143                  | 119               | Brown                | Brown       | 78.65           | 49.65               | 67.31        |
| 20   | 1,627    | 174          | 147           | 107                       | 63                   | 49            | 30             | 30                    | 92                        | 87               | 130                  | 95                | Brown                | Brown       | 84.48           | 48.46               | 61.22        |
| 20   | 1,679    | 185          | 142           | 103                       | 65                   | 42            | 36             | 31                    | 92                        | 87               | 131                  | 116               | Brown                | Brown       | 76.76           | 49.62               | 85.71        |
| 20   | 1,620    | 186          | 144           | 110                       | 54                   | 42            | 36             | 33                    | 95                        | 90               | 132                  | 110               | Brown                | Brown       | 77.42           | 40.91               | 85.71        |
| 20   | 1,621    | 175          | 145           | 107                       | 64                   | 44            | 34             | 33                    | 93                        | 89               | 133                  | 97                | Brown                | Green       | 82.86           | 48.12               | 77.27        |
| 20   | 1,704    | 189          | 150           | 112                       | 70                   | 54            | 34             | 35                    | 106                       | 93               | 142                  | 111               | Brown                | Brown       | 79.37           | 49.30               | 62.96        |
| 22   | 1,721    | 189          | 142           | 107                       | 69                   | 49            | 31             | 30                    | 97                        | 92               | 134                  | 104               | Black                | Brown       | 75.13           | 51.49               | 63.27        |
| 22   | 1,571    | 177          | 146           | 105                       | 62                   | 47            | 30             | 29                    | 93                        | 87               | 137                  | 101               | Brown                | Brown       | 82.49           | 45.25               | 63.83        |
| 22   | 1,722    | 189          | 140           | 111                       | 60                   | 49            | 32             | 32                    | 97                        | 89               | 136                  | 112               | Black                | Brown       | 74.07           | 44.11               | 65.31        |
| 24   | 1,548    | 178          | 157           | 110                       | 62                   | 43            | 34             | 30                    | 100                       | 89               | 140                  | 110               | Brown                | Brown       | 88.20           | 44.29               | 79.07        |
| 24   | 1,581    | 185          | 147           | 104                       | 64                   | 47            | 35             | 31                    | 95                        | 87               | 134                  | 110               | Brown                | Green       | 79.40           | 47.76               | 74.47        |
| 25   | 1,733    | 196          | 150           | 119                       | 68                   | 47            | 40             | 29                    | 102                       | 95               | 145                  | 112               | Brown                | Brown       | 76.53           | 46.90               | 85.11        |
| 30   | 1,676    | 193          | 147           | 111                       | 67                   | 49            | 38             | 33                    | 100                       | 96               | 135                  | 109               | Brown                | Green       | 76.17           | 49.63               | 77.55        |
| 30   | 1,589    | 171          | 146           | 105                       | 56                   | 40            | 30             | 29                    | 93                        | 83               | 131                  | 100               | Brown                | Brown       | 85.38           | 42.75               | 75.60        |
| 30   | 1,659    | 176          | 153           | 103                       | 65                   | 47            | 35             | 28                    | 91                        | 86               | 135                  | 107               | Black                | Brown       | 86.93           | 48.15               | 74.47        |
| 30   | 1,680    | 189          | 150           | 110                       | 66                   | 48            | 33             | 28                    | 98                        | 89               | 135                  | 109               | Brown                | Hazel       | 79.37           | 48.89               | 68.75        |
| 30   | 1,740    | 182          | 154           | 107                       | 68                   | 48            | 35             | 27                    | 97                        | 91               | 137                  | 111               | Black                | Brown       | 84.62           | 49.65               | 72.92        |
| 33   | 1,755    | 180          | 153           | 104                       | 72                   | 49            | 28             | 27                    | 95                        | 90               | 138                  | 110               | Brown                | Green       | 85.00           | 52.15               | 57.14        |
| 33   | 1,574    | 172          | 145           | 105                       | 67                   | 49            | 30             | 31                    | 90                        | 84               | 132                  | 103               | Black                | Green       | 84.30           | 50.76               | 61.22        |
| 35   | 1,685    | 182          | 145           | 107                       | 67                   | 54            | 30             | 27                    | 92                        | 87               | 133                  | 112               | Brown                | Hazel       | 79.67           | 50.38               | 55.56        |
| 35   | 1,626    | 186          | 147           | 110                       | 70                   | 50            | 33             | 32                    | 100                       | 95               | 133                  | 110               | Black                | Brown       | 79.03           | 52.63               | 66.00        |
| 35   | 1,593    | 178          | 145           | 108                       | 65                   | 49            | 33             | 31                    | 102                       | 93               | 137                  | 102               | Black, turning white | Brown       | 81.46           | 47.45               | 67.35        |
| 35   | 1,556    | 175          | 145           | 105                       | 65                   | 47            | 33             | 30                    | 97                        | 87               | 135                  | 113               | Green                | Green       | 82.86           | 48.15               | 70.21        |
| 38   | 1,800    | 183          | 159           | 113                       | 70                   | 53            | 37             | 35                    | 105                       | 100              | 149                  | 122               | Black, turning white | Brown       | 86.89           | 47.30               | 69.81        |



Group II.—*Karima*—continued.

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour.         | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|----------------------|-------------|-----------------|---------------------|--------------|
| 38   | 1,706    | 190          | 157           | 113                       | 64                   | 48            | 37             | 35                    | 103                       | 97               | 147                  | 124               | Black, turning white | Brown       | 82.63           | 43.55               | 77.08        |
| 40   | 1,726    | 194          | 152           | 112                       | 68                   | 51            | 38             | 31                    | 99                        | 91               | 138                  | 108               | White                | Brown       | 78.35           | 49.29               | 74.51        |
| 45   | 1,720    | 173          | 139           | 100                       | 60                   | 44            | 30             | 27                    | 86                        | 82               | 127                  | 96                | Black to white       | Brown       | 80.35           | 47.24               | 68.18        |
| 45   | 1,700    | 193          | 155           | 115                       | 70                   | 49            | 33             | 35                    | 101                       | 95               | 145                  | 115               | Black to white       | Hazel       | 80.31           | 48.29               | 67.35        |
| 50   | 1,697    | 185          | 147           | 106                       | 68                   | 54            | 35             | 32                    | 100                       | 89               | 133                  | 113               | Brown                | Green       | 79.46           | 51.13               | 64.81        |
| 50   | 1,720    | 194          | 151           | 105                       | 71                   | 58            | 37             | 33                    | 99                        | 90               | 138                  | 109               | White                | Green       | 77.84           | 51.45               | 63.79        |
| 50   | 1,705    | 180          | 149           | 107                       | 76                   | 52            | 35             | 30                    | 97                        | 90               | 142                  | 119               | Black to white       | Brown       | 82.78           | 53.52               | 67.31        |
| 55   | 1,662    | 181          | 143           | 108                       | 66                   | 50            | 37             | 33                    | 95                        | 86               | 134                  | 103               | White                | Green       | 79.01           | 49.25               | 74.00        |
| 55   | 1,680    | 181          | 149           | 106                       | 58                   | 45            | 30             | 31                    | 95                        | 88               | 140                  | 105               | Black to white       | Hazel       | 82.32           | 41.43               | 66.67        |
| 55   | 1,690    | 185          | 149           | 109                       | 59                   | 45            | 35             | 30                    | 93                        | 89               | 140                  | 108               | White                | Green       | 80.54           | 42.15               | 77.78        |
| 55   | 1,628    | 185          | 140           | 105                       | 57                   | 43            | 33             | 30                    | 95                        | 90               | 131                  | 110               | Black to white       | Green       | 75.68           | 43.51               | 76.74        |
| 57   | 1,712    | 179          | 146           | 105                       | 70                   | 51            | 39             | 30                    | 97                        | 89               | 138                  | 109               | White                | Green       | 81.56           | 50.75               | 70.47        |
| 60   | 1,644    | 187          | 145           | 100                       | 62                   | 47            | 36             | 33                    | 100                       | 92               | 135                  | 100               | White                | Brown       | 77.54           | 45.93               | 76.60        |
| 27   | 1,688    | 180          | 142           | 108                       | 62                   | 45            | 30             | 30                    | 99                        | 90               | 131                  | 108               | Brown                | Green       | 78.89           | 47.33               | 68.67        |
| 22   | —        | 160          | 136           | 101                       | 54                   | 42            | 30             | 28                    | 98                        | 88               | 129                  | 102               | Brown                | Green       | 85.00           | 41.86               | 71.43        |
| 18   | 1,658    | 188          | 143           | 107                       | 68                   | 50            | 32             | 28                    | 95                        | 86               | 136                  | 101               | Brown                | Brown       | 76.06           | 50.00               | 64.00        |
| 18   | 1,682    | 181          | 146           | 109                       | 65                   | 47            | 35             | 33                    | 101                       | 95               | 135                  | 103               | Brown                | Brown       | 80.66           | 48.15               | 74.47        |
| 18   | 1,706    | 174          | 145           | 107                       | 65                   | 49            | 29             | 26                    | 100                       | 90               | 139                  | 102               | Brown                | Hazel       | 83.33           | 40.78               | 59.18        |

Group II.—*Akanthou, Males.*

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour. | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------|-------------|-----------------|---------------------|--------------|
| 18   | 1,706    | 175          | 149           | 102                       | 69                   | 50            | 31             | 31                    | 100                       | 95               | 132                  | 117               | Brown        | Brown       | 85.14           | 52.27               | 62.00        |
| 18   | 1,715    | 173          | 147           | 107                       | 62                   | 50            | 31             | 30                    | 93                        | 87               | 133                  | 106               | Brown        | Brown       | 84.97           | 46.62               | 62.00        |
| 18   | 1,648    | 173          | 140           | 105                       | 61                   | 46            | 30             | 28                    | 90                        | 84               | 125                  | 100               | Brown        | Brown       | 80.92           | 48.80               | 65.22        |
| 18   | 1,733    | 168          | 149           | 107                       | 63                   | 50            | 35             | 29                    | 102                       | 89               | 140                  | 102               | Brown        | Green       | 88.69           | 45.00               | 70.00        |
| 18   | 1,640    | 176          | 151           | 105                       | 62                   | 47            | 30             | 29                    | 100                       | 89               | 140                  | 108               | Brown        | Hazel       | 85.80           | 44.29               | 63.83        |
| 19   | 1,827    | 179          | 152           | 112                       | 60                   | 44            | 33             | 30                    | 103                       | 93               | 139                  | 115               | Brown        | Blue        | 84.92           | 43.15               | 75.00        |
| 20   | 1,635    | 178          | 159           | 117                       | 66                   | 55            | 37             | 33                    | 100                       | 90               | 141                  | 105               | Black        | Brown       | 89.33           | 46.82               | 67.27        |
| 20   | 1,667    | 168          | 154           | 110                       | 70                   | 46            | 31             | 31                    | 98                        | 90               | 135                  | 115               | Brown        | Brown       | 91.67           | 51.85               | 67.39        |
| 20   | 1,635    | 185          | 140           | 100                       | 62                   | 48            | 34             | 33                    | 100                       | 90               | 133                  | 108               | Brown        | Green       | 75.68           | 46.62               | 70.83        |
| 22   | 1,686    | 189          | 155           | 103                       | 73                   | 50            | 36             | 31                    | 103                       | 95               | 145                  | 110               | Black        | Green       | 82.01           | 50.35               | 72.00        |
| 23   | 1,670    | 174          | 151           | 110                       | 65                   | 46            | 32             | 30                    | 98                        | 88               | 138                  | 113               | Brown        | Green       | 80.78           | 46.75               | 69.57        |
| 26   | 1,757    | 185          | 153           | 108                       | 63                   | 52            | 34             | 30                    | 96                        | 90               | 142                  | 110               | Brown        | Brown       | 82.70           | 44.35               | 65.38        |
| 27   | 1,742    | 183          | 151           | 110                       | 67                   | 53            | 32             | 30                    | 94                        | 90               | 137                  | 107               | Brown        | Hazel       | 82.51           | 48.91               | 60.38        |
| 29   | 1,752    | 197          | 157           | 115                       | 73                   | 56            | 34             | 34                    | 102                       | 97               | 139                  | 101               | Black        | Hazel       | 79.70           | 52.52               | 60.71        |
| 30   | 1,636    | 191          | 159           | 113                       | 71                   | 48            | 36             | 35                    | 105                       | 96               | 138                  | 105               | Black        | Brown       | 83.25           | 51.45               | 75.00        |
| 30   | 1,688    | 183          | 150           | 117                       | 66                   | 47            | 31             | 31                    | 110                       | 100              | 139                  | 102               | Brown        | Brown       | 81.97           | 47.48               | 65.96        |
| 30   | 1,721    | 177          | 149           | 110                       | 68                   | 49            | 33             | 33                    | 100                       | 93               | 139                  | 100               | Brown        | Brown       | 84.18           | 48.95               | 67.35        |
| 30   | 1,732    | 178          | 148           | 102                       | 65                   | 50            | 33             | 33                    | 98                        | 90               | 136                  | 110               | Brown        | Brown       | 83.15           | 47.70               | 60.00        |
| 33   | 1,716    | 180          | 146           | 110                       | 68                   | 53            | 38             | 34                    | 102                       | 96               | 139                  | 112               | Brown        | Brown       | 81.11           | 48.95               | 71.70        |
| 35   | 1,766    | 172          | 153           | 116                       | 63                   | 45            | 33             | 30                    | 100                       | 88               | 140                  | 112               | Brown        | Brown       | 88.95           | 45.00               | 73.33        |
| 35   | 1,795    | 194          | 148           | 110                       | 63                   | 46            | 35             | 35                    | 102                       | 95               | 135                  | 106               | Brown        | Brown       | 76.29           | 46.67               | 76.09        |
| 38   | 1,727    | 181          | 153           | 101                       | 63                   | 46            | 39             | 28                    | 105                       | 92               | 143                  | 113               | Brown        | Hazel       | 84.53           | 44.05               | 84.78        |
| 39   | 1,610    | 176          | 149           | 108                       | 71                   | 50            | 34             | 30                    | 97                        | 89               | 136                  | 107               | Brown        | Brown       | 84.66           | 52.20               | 68.00        |
| 40   | 1,698    | 172          | 149           | 106                       | 66                   | 52            | 30             | 34                    | 100                       | 95               | 139                  | 112               | Black        | Brown       | 86.63           | 47.49               | 57.69        |
| 50   | 1,600    | 178          | 149           | 107                       | 63                   | 48            | 35             | 31                    | 98                        | 89               | 134                  | 108               | Hazel        | Hazel       | 83.71           | 47.01               | 72.92        |
| 40   | 1,630    | 179          | 149           | 104                       | 63                   | 46            | 37             | 28                    | 100                       | 85               | 136                  | 104               | White        | Brown       | 83.24           | 46.35               | 80.43        |
| 30   | 1,600    | 190          | 145           | 110                       | 65                   | 48            | 37             | 33                    | 106                       | 91               | 139                  | 107               | Brown        | Green       | 76.32           | 46.75               | 77.08        |



Group II.—*Hagios Ambrosios.*

| Age. | Stature | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour. | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|---------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------|-------------|-----------------|---------------------|--------------|
| 18   | 1,651   | 176          | 142           | 100                       | 89                   | 45            | 31             | 28                    | 98                        | 95               | 125                  | 94                | Black        | Brown       | 80.68           | 46.45               | 68.89        |
| 32   | 1,642   | 181          | 151           | 110                       | 68                   | 57            | 32             | 31                    | 108                       | 93               | 139                  | 118               | Black        | Brown       | 83.43           | 48.95               | 56.14        |
| 40   | 1,674   | 181          | 151           | 110                       | 63                   | 46            | 37             | 37                    | 107                       | 97               | 143                  | 117               | Brown        | Brown       | 83.43           | 44.05               | 80.43        |
| 40   | 1,674   | 192          | 155           | 110                       | 70                   | 50            | 37             | 32                    | 106                       | 100              | 142                  | 112               | Brown        | Brown       | 80.73           | 49.30               | 74.00        |
| 40   | 1,641   | 181          | 157           | 111                       | 74                   | 50            | 33             | 36                    | 103                       | 95               | 145                  | 120               | White        | Hazel       | 86.74           | 51.05               | 69.00        |
| 40   | 1,651   | 175          | 147           | 104                       | 70                   | 50            | 33             | 30                    | 98                        | 90               | 134                  | 100               | Brown        | Hazel       | 84.00           | 52.24               | 66.00        |
| 47   | 1,693   | 176          | 147           | 102                       | 68                   | 50            | 34             | 30                    | 95                        | 90               | 135                  | 99                | Brown        | Brown       | 83.52           | 50.37               | 68.00        |
| 50   | 1,662   | 175          | 146           | 102                       | 70                   | 58            | 32             | 30                    | 97                        | 86               | 132                  | 104               | White        | Hazel       | 83.43           | 53.03               | 55.17        |
| 50   | 1,610   | 185          | 147           | 102                       | 74                   | 55            | 36             | 30                    | 100                       | 96               | 137                  | 108               | Brown        | Brown       | 79.46           | 54.01               | 65.45        |
| 55   | 1,687   | 181          | 150           | 110                       | 74                   | 61            | 32             | 32                    | 103                       | 90               | 137                  | 110               | White        | Hazel       | 82.87           | 54.01               | 52.46        |
| 60   | 1,716   | 187          | 148           | 108                       | 63                   | 52            | 40             | 32                    | 110                       | 100              | 140                  | 123               | White        | Blue        | 79.14           | 45.00               | 76.96        |
| 60   | 1,682   | 172          | 140           | 102                       | 62                   | 50            | 33             | 33                    | 95                        | 90               | 132                  | 112               | White        | Green       | 81.40           | 46.97               | 66.00        |

Group III.—*Enkomi.*

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour. | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------|-------------|-----------------|---------------------|--------------|
| 35   | 1,677    | 175          | 150           | 105                       | 70                   | 53            | 30             | 30                    | 98                        | 89               | 133                  | 103               | Black        | Brown       | 85.71           | 52.63               | 56.60        |
| 26   | 1,677    | 173          | 142           | 103                       | 67                   | 51            | 29             | 30                    | 91                        | 82               | 133                  | 98                | Black        | Brown       | 82.08           | 50.38               | 56.86        |
| 50   | 1,640    | 175          | 155           | 103                       | 67                   | 50            | 32             | 32                    | 106                       | 98               | 140                  | 107               | White        | Green       | 88.57           | 47.85               | 64.00        |
| 35   | 1,735    | 187          | 150           | 109                       | 68                   | 52            | 34             | 33                    | 105                       | 91               | 135                  | 102               | Brown        | Brown       | 80.21           | 50.37               | 65.38        |
| 25   | 1,742    | 180          | 151           | 108                       | 72                   | 51            | 34             | 31                    | 98                        | 95               | 137                  | 109               | Fair         | Blue        | 83.89           | 52.55               | 66.67        |
| 32   | 1,718    | 170          | 153           | 109                       | 63                   | 51            | 37             | 31                    | 97                        | 86               | 138                  | 107               | Brown        | Green       | 90.00           | 45.65               | 72.55        |
| 28   | 1,655    | 179          | 165           | 112                       | 78                   | 60            | 33             | 32                    | 99                        | 94               | 145                  | 106               | Brown        | Green       | 92.18           | 52.80               | 55.00        |
| 40   | 1,634    | 175          | 148           | 102                       | 70                   | 59            | 33             | 33                    | 103                       | 90               | 139                  | 108               | Brown        | Hazel       | 84.57           | 50.36               | 55.93        |
| 25   | 1,652    | 176          | 150           | 112                       | 68                   | 48            | 30             | 30                    | 101                       | 92               | 139                  | 121               | Brown        | Brown       | 85.23           | 48.95               | 62.50        |
| 38   | 1,711    | 178          | 150           | 105                       | 66                   | 52            | 32             | 28                    | 102                       | 90               | 133                  | 107               | Brown        | Hazel       | 84.27           | 49.62               | 61.54        |
| 22   | 1,680    | 176          | 150           | 110                       | 65                   | 52            | 30             | 27                    | 98                        | 87               | 133                  | 100               | Black        | Hazel       | 85.23           | 48.87               | 57.69        |
| 60   | 1,590    | 180          | 140           | 96                        | 64                   | 49            | 34             | 30                    | 96                        | 84               | 133                  | 108               | White        | Blue        | 77.78           | 48.12               | 69.39        |
| 35   | 1,594    | 168          | 147           | 106                       | 64                   | 52            | 28             | 28                    | 100                       | 85               | 134                  | 105               | Black        | Brown       | 87.50           | 47.76               | 53.85        |
| 18   | 1,590    | 168          | 153           | 102                       | 66                   | 57            | 30             | 29                    | 98                        | 85               | 127                  | 98                | Brown        | Brown       | 91.07           | 51.97               | 52.63        |
| 45   | 1,806    | 180          | 158           | 115                       | 69                   | 59            | 36             | 32                    | 113                       | 92               | 146                  | 112               | Brown        | Brown       | 87.78           | 57.26               | 61.02        |
| 22   | 1,715    | 178          | 149           | 107                       | 62                   | 46            | 36             | 36                    | 107                       | 93               | 144                  | 112               | Brown        | Brown       | 83.71           | 43.05               | 78.26        |
| 60   | 1,685    | 176          | 157           | 103                       | 76                   | 62            | 32             | 32                    | 99                        | 89               | 137                  | 102               | Brown        | Blue        | 89.20           | 55.48               | 51.61        |
| 18   | 1,660    | 169          | 152           | 113                       | 70                   | 53            | 30             | 30                    | 103                       | 88               | 139                  | 103               | Brown        | Brown       | 89.94           | 50.35               | 56.60        |
| 30   | 1,711    | 170          | 152           | 113                       | 70                   | 52            | 36             | 33                    | 100                       | 95               | 140                  | 118               | Brown        | Light brown | 89.41           | 50.00               | 69.23        |
| 26   | 1,780    | 180          | 141           | 103                       | 63                   | 52            | 28             | 32                    | 102                       | 94               | 132                  | 108               | Brown        | Hazel       | 78.33           | 47.73               | 53.85        |
| 30   | 1,634    | 183          | 145           | 109                       | 60                   | 48            | 35             | 30                    | 95                        | 86               | 137                  | 112               | Brown        | Brown       | 79.23           | 43.80               | 72.92        |
| 30   | 1,673    | 177          | 141           | 103                       | 64                   | 55            | 33             | 31                    | 101                       | 96               | 136                  | 123               | Brown        | Brown       | 79.66           | 47.05               | 60.00        |
| 25   | 1,710    | 181          | 146           | 110                       | 64                   | 51            | 33             | 30                    | 107                       | 95               | 139                  | 107               | Brown        | Hazel       | 80.66           | 46.07               | 64.71        |
| 23   | 1,672    | 183          | 146           | 106                       | 67                   | 50            | 32             | 30                    | 98                        | 90               | 134                  | 108               | Brown        | Hazel       | 79.78           | 50.00               | 64.00        |
| 45   | 1,664    | 186          | 151           | 110                       | 70                   | 54            | 34             | 29                    | 104                       | 96               | 145                  | 118               | Brown        | Brown       | 81.18           | 48.30               | 62.96        |
| 22   | 1,653    | 175          | 156           | 108                       | 63                   | 48            | 32             | 30                    | 91                        | 82               | 134                  | 100               | Black        | Hazel       | 89.14           | 47.01               | 66.67        |



Group III.—*Eukomi*—continued.

| Age.            | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour. | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|-----------------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------|-------------|-----------------|---------------------|--------------|
| 45 <sup>7</sup> | 1,700    | 172          | 144           | 108                       | 66                   | 47            | 38             | 32                    | 105                       | 89               | 136                  | 105               | White        | Blue        | 83.72           | 48.55               | 80.85        |
| 19              | 1,722    | 187          | 149           | 107                       | 60                   | 49            | 30             | 30                    | 99                        | 88               | 130                  | 105               | Black        | Hazel       | 79.68           | 46.15               | 61.22        |
| 27              | 1,705    | 175          | 151           | 113                       | 62                   | 48            | 33             | 32                    | 99                        | 89               | 137                  | 109               | Brown        | Hazel       | 86.29           | 45.25               | 68.75        |
| 22              | 1,705    | 184          | 145           | 108                       | 63                   | 52            | 29             | 29                    | 93                        | 88               | 135                  | 108               | Black        | Brown       | 88.41           | 46.67               | 55.77        |
| 28              | 1,710    | 179          | 140           | 104                       | 69                   | 51            | 33             | 28                    | 92                        | 85               | 129                  | 102               | Black        | Hazel       | 78.21           | 53.49               | 64.71        |
| 42              | 1,649    | 180          | 146           | 105                       | 73                   | 58            | 30             | 32                    | 101                       | 88               | 134                  | 104               | Black        | Brown       | 81.11           | 58.21               | 51.72        |
| 18              | 1,608    | 176          | 144           | 108                       | 64                   | 51            | 33             | 31                    | 100                       | 94               | 138                  | 106               | Brown        | Brown       | 81.82           | 46.40               | 64.71        |
| 38              | 1,671    | 169          | 143           | 102                       | 70                   | 55            | 29             | 28                    | 95                        | 87               | 132                  | 111               | Black        | Brown       | 84.62           | 53.03               | 52.73        |
| 38              | 1,710    | 177          | 146           | 110                       | 63                   | 42            | 31             | 31                    | 101                       | 91               | 137                  | 116               | Black        | Sandy       | 82.49           | 46.00               | 73.81        |
| 18              | 1,646    | 177          | 151           | 116                       | 62                   | 49            | 37             | 33                    | 104                       | 97               | 140                  | 110               | Black        | Brown       | 85.31           | 44.30               | 75.51        |
| 18              | 1,633    | 163          | 150           | 107                       | 61                   | 49            | 30             | 26                    | 90                        | 83               | 125                  | 100               | Brown        | Hazel       | 92.02           | 43.80               | 61.22        |
| 50              | 1,727    | 183          | 148           | 107                       | 68                   | 52            | 36             | 30                    | 101                       | 94               | 138                  | 115               | White        | Blue        | 80.87           | 49.30               | 69.23        |
| 48              | 1,746    | 185          | 140           | 105                       | 70                   | 56            | 34             | 28                    | 100                       | 95               | 137                  | 109               | Brown        | Blue        | 75.68           | 51.10               | 60.71        |
| 30              | 1,631    | 178          | 144           | 106                       | 65                   | 46            | 28             | 28                    | 97                        | 88               | 133                  | 102               | Black        | Brown       | 80.90           | 48.87               | 60.87        |
| 22              | 1,715    | 175          | 142           | 104                       | 64                   | 48            | 34             | 25                    | 96                        | 88               | 131                  | 106               | Brown        | Green       | 81.14           | 48.85               | 70.83        |
| 20              | 1,726    | 175          | 144           | 100                       | 58                   | 43            | 30             | 30                    | 97                        | 89               | 131                  | 107               | Black        | Hazel       | 82.29           | 44.27               | 69.77        |
| 25              | 1,726    | 178          | 157           | 110                       | 65                   | 47            | 34             | 30                    | 103                       | 96               | 144                  | 104               | Brown        | Hazel       | 88.20           | 45.15               | 72.34        |
| 22              | 1,680    | 171          | 145           | 100                       | 67                   | 52            | 28             | 28                    | 99                        | 88               | 129                  | 107               | Brown        | Brown       | 84.80           | 51.94               | 53.85        |
| 18              | 1,743    | 170          | 151           | 111                       | 66                   | 50            | 33             | 33                    | 99                        | 95               | 139                  | 110               | Brown        | Brown       | 88.82           | 47.49               | 66.00        |
| 20              | 1,692    | 186          | 157           | 116                       | 65                   | 50            | 33             | 32                    | 104                       | 90               | 142                  | 110               | Black        | Brown       | 84.41           | 45.75               | 66.00        |
| 18              | 1,621    | 175          | 147           | 110                       | 63                   | 50            | 33             | 28                    | 99                        | 90               | 133                  | 104               | Black        | Hazel       | 84.00           | 47.37               | 66.00        |
| 33              | 1,738    | 178          | 143           | 105                       | 73                   | 56            | 31             | 28                    | 103                       | 87               | 135                  | 108               | Brown        | Brown       | 80.34           | 54.07               | 55.36        |
| 35              | 1,803    | 185          | 144           | 107                       | 68                   | 45            | 34             | 35                    | 106                       | 100              | 135                  | 112               | Brown        | Brown       | 77.84           | 50.37               | 75.56        |
| 18              | 1,642    | 178          | 149           | 106                       | 74                   | 58            | 32             | 32                    | 100                       | 89               | 130                  | 100               | Brown        | Brown       | 83.71           | 56.92               | 55.17        |
| 18              | 1,689    | 177          | 150           | 105                       | 66                   | 54            | 30             | 30                    | 92                        | 86               | 130                  | 102               | Brown        | Hazel       | 84.75           | 50.77               | 55.56        |
| 18              | 1,613    | 183          | 136           | 100                       | 63                   | 45            | 34             | 31                    | 100                       | 93               | 132                  | 105               | Brown        | Brown       | 74.32           | 47.73               | 75.56        |

Group III.—*Enkomi*—continued.

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour. | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------|-------------|-----------------|---------------------|--------------|
| 22   | 1,710    | 175          | 147           | 109                       | 71                   | 50            | 28             | 30                    | 99                        | 90               | 132                  | 116               | Brown        | Brown       | 84.00           | 53.79               | 56.00        |
| 32   | 1,651    | 177          | 157           | 106                       | 73                   | 60            | 34             | 32                    | 97                        | 87               | 140                  | 106               | Brown        | Green       | 88.70           | 52.12               | 56.67        |
| 35   | 1,728    | 185          | 150           | 107                       | 76                   | 56            | 32             | 32                    | 101                       | 96               | 139                  | 101               | Brown        | Brown       | 81.08           | 54.85               | 57.14        |
| 38   | 1,726    | 175          | 150           | 103                       | 73                   | 58            | 28             | 30                    | 100                       | 87               | 132                  | 108               | Brown        | Brown       | 83.71           | 55.30               | 48.28        |
| 40   | 1,635    | 179          | 149           | 98                        | 78                   | 59            | 34             | 30                    | 93                        | 84               | 131                  | 105               | Brown        | Brown       | 83.24           | 59.54               | 57.63        |
| 45   | 1,748    | 179          | 151           | 109                       | 68                   | 57            | 37             | 33                    | 105                       | 95               | 143                  | 110               | Brown        | Green       | 84.36           | 47.55               | 64.91        |
| 56   | 1,534    | 184          | 148           | 110                       | 70                   | 55            | 38             | 35                    | 103                       | 95               | 142                  | 122               | Brown        | Brown       | 80.43           | 49.30               | 69.09        |
| 60   | 1,655    | 179          | 145           | 103                       | 65                   | 52            | 35             | 33                    | 102                       | 89               | 132                  | 102               | White        | Blue        | 81.01           | 49.24               | 67.31        |

Group III.—*Limnca*.

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour.       | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------------|-------------|-----------------|---------------------|--------------|
| 25   | 1,638    | 182          | 140           | 105                       | 63                   | 47            | 30             | 31                    | 93                        | 88               | 127                  | 102               | Brown              | Green       | 76.92           | 49.61               | 63.83        |
| 38   | 1,712    | 185          | 148           | 105                       | 74                   | 48            | 33             | 30                    | 102                       | 87               | 137                  | 106               | Brown              | Blue        | 80.00           | 54.07               | 68.75        |
| 25   | 1,698    | 181          | 155           | 113                       | 74                   | 58            | 36             | 34                    | 105                       | 100              | 142                  | 108               | Brown              | Brown       | 85.64           | 52.15               | 62.07        |
| 43   | 1,704    | 166          | 153           | 110                       | 69                   | 48            | 37             | 30                    | 100                       | 95               | 135                  | 107               | Black, going white | Green       | 92.17           | 51.11               | 77.08        |
| 28   | 1,666    | 176          | 148           | 102                       | 70                   | 52            | 33             | 29                    | 95                        | 87               | 125                  | 100               | Black              | Brown       | 84.09           | 56.00               | 63.46        |
| 80   | 1,742    | 174          | 150           | 108                       | 69                   | 56            | 39             | 33                    | 103                       | 90               | 136                  | 115               | White              | Blue        | 86.21           | 50.75               | 69.64        |
| 48   | 1,691    | 185          | 143           | 106                       | 67                   | 47            | 34             | 35                    | 102                       | 94               | 130                  | 108               | Black, going white | Green       | 77.30           | 51.54               | 72.34        |
| 50   | 1,732    | 177          | 145           | 105                       | 75                   | 51            | 35             | 33                    | 99                        | 95               | 133                  | 110               | Brown, going white | Blue        | 81.92           | 56.39               | 81.92        |
| 50   | 1,651    | 176          | 140           | 99                        | 62                   | 50            | 34             | 30                    | 93                        | 83               | 129                  | 106               | Black, going white | Brown       | 79.55           | 48.06               | 68.00        |
| 70   | 1,610    | 174          | 142           | 97                        | 68                   | 52            | 33             | 29                    | 93                        | 85               | 130                  | 97                | White              | Blue        | 81.61           | 52.31               | 63.46        |



Group III.—*Linnaea*—continued.

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour.       | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------------|-------------|-----------------|---------------------|--------------|
| 39   | 1,620    | 187          | 145           | 115                       | 63                   | 49            | 36             | 35                    | 103                       | 95               | 142                  | 115               | Brown              | Green       | 77.54           | 44.37               | 73.47        |
| 60   | 1,735    | 179          | 150           | 106                       | 76                   | 56            | 37             | 32                    | 97                        | 89               | 141                  | 114               | White              | Blue        | 88.83           | 53.91               | 66.07        |
| 46   | 1,722    | 180          | 151           | 120                       | 67                   | 50            | 37             | 37                    | 103                       | 97               | 139                  | 115               | Brown, going white | Brown       | 83.89           | 48.21               | 74.00        |
| 60   | 1,690    | 173          | 143           | 105                       | 66                   | 49            | 35             | 27                    | 100                       | 89               | 145                  | 108               | White              | Brown       | 82.66           | 45.51               | 71.43        |
| 45   | 1,735    | 196          | 147           | 105                       | 72                   | 55            | 39             | 30                    | 100                       | 95               | 135                  | 111               | Brown              | Brown       | 75.00           | 53.33               | 70.91        |
| 25   | 1,690    | 173          | 153           | 112                       | 67                   | 52            | 32             | 32                    | 99                        | 90               | 137                  | 110               | Brown              | Green       | 88.44           | 48.92               | 61.54        |
| 19   | 1,708    | 175          | 150           | 110                       | 67                   | 52            | 34             | 32                    | 95                        | 90               | 132                  | 107               | Auburn             | Green       | 85.71           | 50.76               | 65.38        |
| 30   | 1,706    | 179          | 152           | 114                       | 78                   | 57            | 34             | 36                    | 105                       | 100              | 137                  | 110               | Brown              | Green       | 84.92           | 56.93               | 59.65        |
| 70   | 1,684    | 194          | 144           | 106                       | 66                   | 55            | 35             | 29                    | 97                        | 90               | 138                  | 114               | White              | Brown       | 74.23           | 47.85               | 63.64        |
| 33   | 1,815    | 191          | 153           | 110                       | 65                   | 50            | 33             | 33                    | 105                       | 100              | 145                  | 110               | Brown              | Brown       | 80.10           | 44.82               | 66.00        |
| 38   | 1,706    | 188          | 149           | 113                       | 75                   | 57            | 33             | 33                    | 100                       | 95               | 137                  | 115               | Brown              | Brown       | 79.26           | 54.72               | 57.89        |
| 35   | 1,640    | 178          | 153           | 107                       | 65                   | 48            | 33             | 33                    | 99                        | 92               | 139                  | 99                | Brown              | Brown       | 85.96           | 46.76               | 68.75        |
| 23   | 1,711    | 185          | 149           | 111                       | 70                   | 50            | 34             | 31                    | 100                       | 97               | 137                  | 120               | Brown              | Brown       | 80.54           | 51.11               | 64.00        |
| 35   | 1,762    | 178          | 155           | 105                       | 61                   | 50            | 35             | 30                    | 96                        | 89               | 140                  | 116               | Black, going white | Brown       | 87.08           | 43.56               | 70.00        |
| 22   | 1,762    | 178          | 160           | 110                       | 65                   | 53            | 30             | 32                    | 98                        | 87               | 141                  | 108               | Brown              | Green       | 89.89           | 46.10               | 56.60        |
| 45   | 1,783    | 191          | 153           | 110                       | 67                   | 52            | 35             | 33                    | 103                       | 100              | 148                  | 118               | Black              | Green       | 80.10           | 45.39               | 67.31        |
| 40   | 1,712    | 179          | 142           | 109                       | 63                   | 49            | 32             | 33                    | 97                        | 92               | 135                  | 108               | Black              | Green       | 79.33           | 46.67               | 65.31        |
| 30   | 1,732    | 180          | 142           | 107                       | 62                   | 49            | 31             | 35                    | 101                       | 94               | 142                  | 120               | Brown              | Blue        | 78.89           | 43.66               | 63.27        |
| 18   | 1,690    | 175          | 152           | 111                       | 68                   | 54            | 32             | 32                    | 100                       | 90               | 136                  | 108               | Brown              | Brown       | 86.86           | 50.00               | 59.26        |
| 40   | 1,680    | 171          | 145           | 103                       | 70                   | 53            | 35             | 32                    | 92                        | 87               | 127                  | 96                | White              | Brown       | 84.80           | 55.12               | 66.04        |
| 42   | 1,736    | 179          | 163           | 107                       | 70                   | 56            | 34             | 30                    | 100                       | 90               | 141                  | 107               | Black              | Green       | 91.06           | 49.65               | 60.71        |
| 20   | 1,815    | 190          | 164           | 115                       | 63                   | 45            | 32             | 30                    | 100                       | 91               | 140                  | 114               | Chestnut           | Hazel       | 86.32           | 45.00               | 71.11        |
| 40   | 1,735    | 189          | 141           | 107                       | 75                   | 55            | 33             | 33                    | 100                       | 91               | 130                  | 101               | Brown              | Green       | 74.60           | 57.69               | 60.00        |
| 25   | 1,707    | 183          | 157           | 110                       | 68                   | 50            | 30             | 33                    | 103                       | 95               | 135                  | 100               | Brown              | Brown       | 85.79           | 50.37               | 60.00        |

Group III.—*Limnea*—continued.

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour.       | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------------|-------------|-----------------|---------------------|--------------|
| 18   | 1,637    | 171          | 150           | 109                       | 68                   | 54            | 32             | 33                    | 99                        | 93               | 134                  | 101               | Brown              | Brown       | 87.72           | 50.75               | 59.26        |
| 45   | 1,656    | 183          | 147           | 107                       | 68                   | 51            | 38             | 30                    | 101                       | 95               | 143                  | 112               | Brown, going white | Brown       | 80.33           | 47.55               | 74.51        |
| 38   | 1,692    | 185          | 147           | 108                       | 57                   | 46            | 39             | 34                    | 107                       | 97               | 139                  | 110               | Brown              | Brown       | 79.46           | 41.02               | 84.78        |
| 30   | 1,617    | 181          | 147           | 106                       | 65                   | 48            | 33             | 31                    | 96                        | 91               | 135                  | 97                | Brown              | Green       | 81.22           | 48.15               | 68.75        |
| 27   | 1,616    | 160          | 145           | 102                       | 61                   | 46            | 31             | 33                    | 95                        | 87               | 135                  | 108               | Medium brown       | Blue        | 90.63           | 45.19               | 67.39        |
| 40   | 1,745    | 182          | 160           | 110                       | 75                   | 56            | 35             | 30                    | 101                       | 95               | 145                  | 110               | Black, going white | Brown       | 87.91           | 53.80               | 62.50        |
| 41   | 1,730    | 185          | 155           | 107                       | 68                   | 50            | 38             | 35                    | 104                       | 100              | 143                  | 114               | Black, going white | Brown       | 83.78           | 47.55               | 76.00        |
| 18   | 1,677    | 174          | 143           | 111                       | 67                   | 52            | 35             | 31                    | 103                       | 93               | 133                  | 105               | Brown              | Green       | 82.18           | 50.38               | 67.31        |
| 19   | 1,636    | 173          | 145           | 115                       | 63                   | 46            | 36             | 35                    | 107                       | 96               | 139                  | 107               | Brown              | Brown       | 83.82           | 45.35               | 78.26        |
| 21   | 1,726    | 184          | 146           | 113                       | 65                   | 49            | 35             | 35                    | 105                       | 98               | 139                  | 108               | Brown              | Green       | 79.35           | 46.79               | 71.43        |
| 22   | 1,775    | 175          | 153           | 114                       | 63                   | 48            | 34             | 30                    | 105                       | 95               | 137                  | 101               | Black              | Light brown | 87.43           | 45.99               | 70.83        |
| 24   | 1,726    | 183          | 143           | 107                       | 68                   | 50            | 35             | 31                    | 99                        | 93               | 132                  | 110               | Brown              | Brown       | 78.14           | 51.52               | 70.00        |
| 26   | 1,634    | 179          | 151           | 104                       | 70                   | 54            | 32             | 30                    | 97                        | 87               | 137                  | 108               | Brown              | Brown       | 84.36           | 51.20               | 59.26        |
| 32   | 1,735    | 170          | 157           | 101                       | 76                   | 59            | 39             | 29                    | 96                        | 90               | 138                  | 122               | Brown              | Green       | 92.35           | 55.07               | 66.10        |
| 35   | 1,821    | 170          | 151           | 110                       | 66                   | 53            | 33             | 30                    | 102                       | 93               | 135                  | 114               | Brown              | Green       | 88.82           | 48.89               | 62.26        |
| 45   | 1,710    | 184          | 150           | 109                       | 70                   | 53            | 32             | 31                    | 100                       | 93               | 140                  | 108               | Brown, going white | Brown       | 81.53           | 49.90               | 60.38        |
| 65   | 1,856    | 175          | 162           | 106                       | 73                   | 53            | 38             | 35                    | 110                       | 100              | 145                  | 120               | Black, going white | Green       | 86.86           | 50.35               | 71.70        |
| 18   | 1,670    | 169          | 149           | 104                       | 68                   | 48            | 30             | 26                    | 95                        | 86               | 130                  | 100               | Brown              | Brown       | 88.17           | 52.31               | 62.50        |
| 18   | 1,770    | 170          | 150           | 110                       | 67                   | 50            | 33             | 32                    | 101                       | 89               | 136                  | 110               | Brown              | Brown       | 88.24           | 49.26               | 66.00        |



Group III.—*Hapies Sergios.*

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour. | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------|-------------|-----------------|---------------------|--------------|
| 18   | 1,478    | 189          | 145           | 108                       | 58                   | 48            | 28             | 32                    | 95                        | 84               | 122                  | 91                | Brown        | Green       | 76.72           | 47.54               | 58.33        |
| 18   | 1,629    | 176          | 142           | 108                       | 67                   | 58            | 30             | 32                    | 96                        | 89               | 137                  | 90                | Brown        | Blue        | 80.68           | 48.91               | 51.72        |
| 18   | 1,620    | 170          | 151           | 106                       | 62                   | 48            | 30             | 29                    | 93                        | 82               | 131                  | 100               | Brown        | Brown       | 88.82           | 47.33               | 62.50        |
| 19   | 1,750    | 165          | 151           | 101                       | 63                   | 52            | 33             | 31                    | 100                       | 87               | 133                  | 112               | Brown        | Brown       | 91.52           | 47.37               | 63.46        |
| 19   | 1,755    | 172          | 146           | 110                       | 70                   | 52            | 33             | 35                    | 104                       | 92               | 132                  | 112               | Brown        | Brown       | 84.88           | 53.03               | 63.46        |
| 20   | 1,695    | 185          | 150           | 103                       | 67                   | 51            | 36             | 32                    | 103                       | 90               | 138                  | 109               | Brown        | Green       | 81.08           | 48.55               | 70.59        |
| 20   | 1,772    | 180          | 145           | 110                       | 67                   | 57            | 33             | 31                    | 100                       | 89               | 135                  | 112               | Black        | Brown       | 80.56           | 49.63               | 57.89        |
| 20   | 1,616    | 183          | 150           | 106                       | 68                   | 53            | 34             | 30                    | 100                       | 91               | 135                  | 99                | Black        | Brown       | 81.97           | 50.37               | 64.15        |
| 20   | 1,586    | 188          | 142           | 108                       | 60                   | 50            | 33             | 33                    | 105                       | 85               | 130                  | 105               | Brown        | Blue        | 75.53           | 46.15               | 66.00        |
| 20   | 1,750    | 184          | 147           | 110                       | 67                   | 53            | 34             | 30                    | 105                       | 93               | 133                  | 104               | Brown        | Brown       | 79.89           | 50.38               | 64.15        |
| 20   | 1,773    | 169          | 152           | 111                       | 66                   | 56            | 30             | 30                    | 100                       | 94               | 133                  | 103               | Black        | Brown       | 89.94           | 49.62               | 53.57        |
| 20   | 1,642    | 175          | 141           | 100                       | 66                   | 50            | 30             | 28                    | 94                        | 83               | 127                  | 105               | Brown        | Brown       | 80.57           | 51.97               | 60.00        |
| 20   | 1,733    | 173          | 148           | 102                       | 64                   | 48            | 30             | 28                    | 106                       | 90               | 130                  | 107               | Brown        | Sandy       | 85.55           | 49.23               | 62.50        |
| 20   | 1,660    | 176          | 143           | 103                       | 64                   | 54            | 32             | 31                    | 98                        | 89               | 129                  | 102               | Brown        | Brown       | 81.25           | 49.61               | 59.26        |
| 20   | 1,645    | 179          | 148           | 110                       | 66                   | 40            | 34             | 33                    | 99                        | 89               | 133                  | 109               | Brown        | Brown       | 82.68           | 49.62               | 69.39        |
| 20   | 1,635    | 166          | 147           | 107                       | 63                   | 48            | 35             | 34                    | 101                       | 90               | 129                  | 104               | Black        | Brown       | 88.55           | 48.84               | 72.92        |
| 21   | 1,656    | 179          | 151           | 108                       | 64                   | 50            | 34             | 30                    | 106                       | 93               | 140                  | 110               | Brown        | Green       | 84.36           | 45.72               | 68.00        |
| 21   | 1,670    | 184          | 161           | 112                       | 60                   | 51            | 36             | 33                    | 104                       | 94               | 140                  | 116               | Brown        | Brown       | 87.50           | 42.85               | 70.59        |
| 22   | 1,702    | 177          | 156           | 108                       | 64                   | 50            | 33             | 30                    | 107                       | 88               | 140                  | 111               | Brown        | Brown       | 88.14           | 45.72               | 66.00        |
| 22   | 1,760    | 176          | 142           | 107                       | 69                   | 50            | 36             | 29                    | 100                       | 86               | 135                  | 100               | Black        | Green       | 80.68           | 51.11               | 72.00        |
| 22   | 1,671    | 176          | 140           | 105                       | 70                   | 56            | 35             | 30                    | 91                        | 85               | 129                  | 106               | Brown        | Brown       | 79.55           | 54.26               | 62.50        |
| 24   | 1,728    | 167          | 147           | 109                       | 69                   | 53            | 30             | 30                    | 103                       | 90               | 137                  | 112               | Medium       | Light brown | 88.02           | 50.35               | 56.60        |
| 25   | 1,754    | 174          | 157           | 105                       | 70                   | 55            | 30             | 30                    | 102                       | 95               | 143                  | 115               | Brown        | Brown       | 90.23           | 48.95               | 54.55        |
| 25   | 1,636    | 171          | 149           | 108                       | 62                   | 53            | 30             | 32                    | 96                        | 86               | 135                  | 106               | Black        | Brown       | 83.04           | 45.93               | 56.60        |
| 25   | 1,687    | 187          | 150           | 109                       | 73                   | 53            | 34             | 33                    | 102                       | 86               | 133                  | 110               | Brown        | Brown       | 80.21           | 54.89               | 64.15        |
| 25   | 1,670    | 176          | 148           | 108                       | 68                   | 52            | 32             | 32                    | 106                       | 94               | 140                  | 110               | Black        | Brown       | 84.09           | 48.55               | 61.54        |
| 25   | 1,708    | 187          | 147           | 103                       | 67                   | 51            | 28             | 28                    | 101                       | 90               | 138                  | 107               | Brown        | Green       | 78.61           | 48.55               | 54.90        |

Group III.—*Hagios Services*—continued.

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigenital Breadth. | Hair Colour.       | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|--------------------|--------------------|-------------|-----------------|---------------------|--------------|
| 25   | 1,594    | 178          | 151           | 110                       | 70                   | 53            | 32             | 32                    | 100                       | 92               | 132                  | 113                | Brown              | Brown       | 84.83           | 53.03               | 60.38        |
| 25   | 1,682    | 180          | 156           | 107                       | 60                   | 47            | 33             | 32                    | 100                       | 88               | 138                  | 109                | Black              | Blue        | 86.67           | 43.48               | 70.21        |
| 30   | 1,664    | 181          | 151           | 110                       | 76                   | 58            | 32             | 32                    | 100                       | 93               | 135                  | 111                | Brown              | Brown       | 83.43           | 56.30               | 53.17        |
| 30   | 1,796    | 185          | 144           | 107                       | 72                   | 55            | 34             | 34                    | 96                        | 89               | 137                  | 114                | Brown              | Brown       | 77.84           | 52.55               | 61.82        |
| 31   | 1,720    | 186          | 148           | 109                       | 65                   | 47            | 30             | 32                    | 103                       | 95               | 135                  | 112                | Black              | Brown       | 79.57           | 48.15               | 63.83        |
| 32   | 1,760    | 179          | 147           | 105                       | 70                   | 57            | 38             | 31                    | 100                       | 89               | 136                  | 118                | Black              | Brown       | 82.12           | 51.49               | 66.67        |
| 35   | 1,573    | 178          | 143           | 107                       | 66                   | 52            | 34             | 33                    | 98                        | 92               | 135                  | 106                | Black              | Brown       | 80.34           | 48.89               | 63.38        |
| 35   | 1,770    | 192          | 142           | 107                       | 60                   | 50            | 28             | 32                    | 108                       | 88               | 131                  | 117                | Brown              | Green       | 73.96           | 45.80               | 56.00        |
| 35   | 1,732    | 177          | 156           | 113                       | 66                   | 54            | 27             | 34                    | 105                       | 93               | 140                  | 104                | Black              | Hazel       | 88.14           | 47.15               | 50.00        |
| 36   | 1,492    | 175          | 142           | 104                       | 68                   | 50            | 34             | 32                    | 100                       | 90               | 133                  | 100                | Black              | Hazel       | 81.14           | 51.13               | 68.00        |
| 38   | 1,638    | 171          | 153           | 109                       | 74                   | 50            | 37             | 32                    | 106                       | 93               | 140                  | 110                | Black              | Brown       | 89.47           | 52.87               | 74.00        |
| 40   | 1,736    | 180          | 151           | 110                       | 74                   | 51            | 35             | 35                    | 97                        | 87               | 138                  | 110                | Brown              | Blue        | 83.89           | 53.62               | 68.63        |
| 40   | 1,518    | 184          | 141           | 105                       | 64                   | 49            | 33             | 32                    | 103                       | 86               | 134                  | 101                | Brown              | Hazel       | 76.83           | 46.76               | 67.35        |
| 40   | 1,603    | 176          | 146           | 105                       | 60                   | 50            | 35             | 33                    | 95                        | 88               | 133                  | 105                | Brown              | Green       | 82.95           | 45.11               | 70.00        |
| 40   | 1,814    | 186          | 147           | 108                       | 70                   | 50            | 32             | 33                    | 106                       | 90               | 136                  | 110                | Black              | Hazel       | 79.03           | 51.49               | 64.00        |
| 42   | 1,780    | 196          | 145           | 101                       | 65                   | 50            | 32             | 35                    | 109                       | 96               | 135                  | 117                | Brown              | Brown       | 73.98           | 48.15               | 64.00        |
| 44   | 1,686    | 188          | 145           | 106                       | 66                   | 58            | 32             | 25                    | 103                       | 86               | 139                  | 103                | Brown              | Brown       | 77.13           | 47.49               | 55.17        |
| 45   | 1,680    | 174          | 148           | 106                       | 72                   | 54            | 33             | 33                    | 93                        | 85               | 140                  | 102                | Brown              | Brown       | 85.06           | 51.45               | 62.26        |
| 48   | 1,744    | 170          | 157           | 110                       | 63                   | 52            | 30             | 30                    | 100                       | 92               | 138                  | 110                | Black              | Brown       | 92.35           | 45.65               | 57.69        |
| 48   | 1,672    | 190          | 142           | 101                       | 72                   | 52            | 28             | 30                    | 100                       | 92               | 133                  | 104                | Brown              | Brown       | 74.74           | 54.14               | 53.85        |
| 50   | 1,756    | 183          | 138           | 108                       | 68                   | 55            | 32             | 35                    | 98                        | 80               | 129                  | 105                | White              | Green       | 75.41           | 52.71               | 58.18        |
| 50   | 1,660    | 177          | 149           | 107                       | 66                   | 50            | 32             | 33                    | 100                       | 80               | 140                  | 106                | Brown, going white | Brown       | 84.18           | 47.14               | 64.00        |
| 52   | 1,615    | 179          | 145           | 106                       | 66                   | 50            | 42             | 33                    | 93                        | 89               | 133                  | 107                | White              | Green       | 81.01           | 49.62               | 84.00        |
| 52   | 1,670    | 184          | 149           | 106                       | 70                   | 51            | 36             | 32                    | 102                       | 88               | 137                  | 108                | Brown              | Brown       | 80.98           | 51.12               | 70.59        |
| 52   | 1,625    | 179          | 152           | 113                       | 68                   | 58            | 33             | 31                    | 97                        | 87               | 139                  | 108                | White              | Green       | 84.92           | 48.95               | 56.90        |
| 62   | 1,711    | 181          | 150           | 100                       | 68                   | 52            | 38             | 32                    | 97                        | 86               | 142                  | 110                | White              | Brown       | 82.87           | 47.89               | 73.08        |
| 22   | 1,680    | 180          | 151           | 114                       | 72                   | 53            | 33             | 32                    | 106                       | 103              | 141                  | 115                | Brown              | Brown       | 83.89           | 51.05               | 62.26        |



Group IV.—*Leukomiko*.

| Age. | Stature. | Sternal Height. | Trochanteric Height. | Tip of Middle Finger from Ground. | Head Length. | Head Breadth. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour. | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|-----------------|----------------------|-----------------------------------|--------------|---------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------|-------------|-----------------|---------------------|--------------|
| 20   | 1,730    | 1,417           | 920                  | 700                               | 168          | 150           | 74                   | 51            | 33             | 31                    | 107                       | 88               | 137                  | 104               | Brown        | Green       | 89.29           | 54.01               | 64.71        |
| 20   | 1,698    | 1,400           | 880                  | 586                               | 176          | 147           | 64                   | 55            | 33             | 29                    | 105                       | 95               | 134                  | 106               | Black        | Brown       | 83.52           | 47.76               | 60.00        |
| 20   | 1,737    | 1,440           | 970                  | 630                               | 179          | 150           | 64                   | 55            | 35             | 31                    | 110                       | 90               | 137                  | 104               | Brown        | Brown       | 83.80           | 46.72               | 63.64        |
| 20   | 1,730    | 1,417           | 935                  | 633                               | 176          | 156           | 63                   | 46            | 36             | 32                    | 105                       | 99               | 144                  | 114               | Brown        | Brown       | 88.64           | 43.76               | 78.26        |
| 22   | 1,622    | 1,334           | 855                  | 623                               | 177          | 143           | 72                   | 48            | 32             | 29                    | 100                       | 86               | 131                  | 101               | Brown        | Brown       | 80.79           | 54.96               | 66.67        |
| 22   | 1,684    | 1,375           | 854                  | 652                               | 175          | 155           | 76                   | 54            | 38             | 31                    | 100                       | 82               | 134                  | 102               | Black        | Brown       | 88.57           | 50.72               | 70.37        |
| 22   | 1,583    | 1,312           | 871                  | 590                               | 170          | 153           | 66                   | 48            | 28             | 28                    | 100                       | 85               | 137                  | 116               | Black        | Brown       | 90.00           | 48.17               | 58.33        |
| 23   | 1,697    | 1,400           | 895                  | 661                               | 177          | 152           | 68                   | 54            | 35             | 38                    | 110                       | 93               | 136                  | 110               | Brown        | Light brown | 85.88           | 50.00               | 64.81        |
| 25   | 1,757    | 1,445           | 960                  | 650                               | 195          | 149           | 58                   | —             | 40             | 34                    | 108                       | 96               | 140                  | 109               | Brown        | Blue        | 76.41           | 41.42               | —            |
| 25   | 1,711    | 1,425           | 926                  | 650                               | 179          | 149           | 70                   | 51            | 37             | 27                    | 103                       | 87               | 137                  | 97                | Black        | Hazel       | 83.24           | 51.12               | 72.55        |
| 27   | 1,672    | 1,352           | 853                  | 637                               | 178          | 152           | 70                   | 50            | 36             | 35                    | 100                       | 87               | 137                  | 107               | Black        | Brown       | 85.39           | 51.10               | 72.00        |
| 27   | 1,617    | 1,430           | 917                  | 617                               | 171          | 147           | 64                   | 51            | 34             | 33                    | 104                       | 87               | 136                  | 108               | Black        | Brown       | 85.96           | 47.06               | 66.67        |
| 28   | 1,772    | 1,474           | 990                  | 693                               | 189          | 157           | 74                   | 61            | 45             | 34                    | 112                       | 105              | 138                  | 114               | Black        | Brown       | 83.07           | 53.62               | 73.77        |
| 30   | 1,792    | 1,474           | 955                  | 662                               | 183          | 148           | 67                   | 57            | 44             | 33                    | 112                       | 94               | 140                  | 115               | Black        | Brown       | 80.87           | 47.86               | 77.19        |
| 30   | 1,696    | 1,422           | 895                  | 681                               | 190          | 157           | 70                   | 51            | 40             | 32                    | 113                       | 93               | 142                  | 108               | Black        | Brown       | 82.63           | 43.30               | 78.43        |
| 30   | 1,656    | 1,388           | 851                  | 638                               | 180          | 157           | 66                   | 54            | 33             | 31                    | 105                       | 89               | 140                  | 103               | Black        | Brown       | 87.22           | 47.15               | 61.11        |
| 30   | 1,770    | 1,387           | 916                  | 679                               | 173          | 145           | 69                   | 55            | 36             | 36                    | 112                       | 93               | 136                  | 108               | Black        | Blue        | 83.82           | 50.70               | 65.45        |
| 30   | 1,617    | 1,334           | 870                  | 650                               | 180          | 147           | 66                   | 50            | 39             | 37                    | 105                       | 96               | 130                  | 109               | Black        | Brown       | 81.67           | 50.00               | 78.00        |
| 30   | 1,679    | 1,399           | 895                  | 710                               | 178          | 148           | 68                   | 50            | 36             | 34                    | 114                       | 94               | 140                  | 110               | Black        | Hazel       | 83.15           | 48.55               | 72.00        |
| 30   | 1,631    | 1,351           | 930                  | 631                               | 179          | 152           | 67                   | 53            | 33             | 32                    | 99                        | 88               | 134                  | 97                | Brown        | Brown       | 84.92           | 50.00               | 62.26        |
| 30   | 1,814    | 1,494           | 1,000                | 687                               | 178          | 149           | 77                   | 57            | 32             | 30                    | 110                       | 88               | 140                  | 108               | Black        | Brown       | 83.71           | 55.00               | 56.14        |
| 30   | 1,668    | 1,377           | 957                  | 584                               | 188          | 146           | 64                   | 45            | 34             | 24                    | 100                       | 86               | 132                  | 105               | Brown        | Brown       | 77.96           | 48.48               | 75.56        |
| 35   | 1,796    | 1,482           | 934                  | 690                               | 173          | 157           | 78                   | 60            | 37             | 28                    | 106                       | 85               | 135                  | 102               | Brown        | Sandy       | 90.75           | 57.78               | 61.67        |
| 35   | 1,620    | 1,320           | 922                  | 602                               | 182          | 148           | 65                   | 45            | 40             | 35                    | 110                       | 92               | 134                  | 105               | Black        | Brown       | 81.32           | 48.51               | 88.89        |
| 35   | 1,587    | 1,312           | 874                  | 645                               | 162          | 140           | 62                   | 45            | 38             | 28                    | 99                        | 78               | 124                  | 92                | Black        | Brown       | 86.42           | 50.00               | 84.44        |
| 40   | 1,735    | 1,420           | 934                  | 654                               | 187          | 149           | 70                   | 63            | 37             | 37                    | 108                       | 104              | 134                  | 108               | Black        | Brown       | 79.68           | 52.24               | 58.73        |
| 40   | 1,670    | 1,352           | 871                  | 620                               | 189          | 150           | 67                   | 49            | 43             | 40                    | 111                       | 96               | 150                  | 110               | White        | Brown       | 79.37           | 44.67               | 87.76        |

Group IV.—*Levkoniko*—continued.

| Age. | Stature. | Sternal Height. | Tip of Middle Finger from Ground. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour. | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|-----------------|-----------------------------------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------|-------------|-----------------|---------------------|--------------|
| 20   | 1,672    | 1,384           | 610                               | 170          | 147           | 106                       | 67                   | 49            | 36             | 33                    | 105                       | 95               | 139                  | 118               | Black        | Hazel       | 86.47           | 48.21               | 73.47        |
| 20   | 1,660    | 1,385           | 654                               | 176          | 150           | 111                       | 64                   | 50            | 35             | 33                    | 112                       | 91               | 139                  | 112               | Brown        | Brown       | 85.23           | 46.05               | 70.00        |
| 20   | 1,610    | 1,318           | 582                               | 173          | 150           | 105                       | 68                   | 50            | 38             | 30                    | 101                       | 85               | 139                  | 103               | Black        | Brown       | 86.71           | 48.92               | 76.00        |
| 20   | 1,773    | —               | —                                 | 169          | 155           | 108                       | 60                   | 47            | 30             | 30                    | 102                       | 88               | 135                  | 112               | Brown        | Brown       | 91.72           | 44.44               | 63.83        |
| 21   | 1,571    | 1,292           | 556                               | 172          | 157           | 112                       | 67                   | 43            | 36             | 33                    | 107                       | 90               | 141                  | 105               | Black        | Green       | 91.28           | 57.52               | 83.72        |
| 22   | 1,763    | 1,461           | 663                               | 178          | 152           | 106                       | 76                   | 58            | 36             | 26                    | 102                       | 93               | 138                  | 109               | Brown        | Green       | 85.39           | 55.08               | 62.07        |
| 22   | 1,635    | 1,346           | 680                               | 173          | 155           | 108                       | 67                   | 55            | 39             | 35                    | 103                       | 94               | 142                  | 114               | Black        | Brown       | 89.60           | 47.20               | 70.91        |
| 22   | 1,613    | 1,317           | 637                               | 185          | 160           | 114                       | 79                   | 51            | 32             | 31                    | 105                       | 93               | 137                  | 106               | Black        | Brown       | 86.49           | 57.67               | 62.75        |
| 22   | 1,690    | —               | —                                 | 175          | 159           | 113                       | 70                   | 52            | 33             | 34                    | 108                       | 97               | 141                  | 108               | Green        | Green       | 90.86           | 49.65               | 63.46        |
| 25   | 1,770    | 1,485           | 673                               | 176          | 152           | 111                       | 76                   | 52            | 35             | 38                    | 117                       | 99               | 140                  | 110               | Brown        | Brown       | 86.36           | 54.28               | 67.31        |
| 25   | 1,771    | 1,478           | 657                               | 184          | 149           | 102                       | 70                   | 54            | 38             | 36                    | 111                       | 94               | 135                  | 104               | Black        | Blue        | 80.98           | 51.85               | 70.37        |
| 25   | 1,640    | 1,374           | 650                               | 184          | 145           | 106                       | 66                   | 47            | 33             | 32                    | 101                       | 85               | 139                  | 106               | Brown        | Hazel       | 78.80           | 47.47               | 70.21        |
| 30   | 1,770    | 1,480           | 680                               | 182          | 151           | 109                       | 66                   | 56            | 36             | 36                    | 109                       | 95               | 139                  | 108               | Black        | Hazel       | 82.97           | 47.47               | 64.29        |
| 30   | 1,740    | 1,432           | 630                               | 178          | 154           | 103                       | 70                   | 50            | 33             | 32                    | 105                       | 90               | 140                  | 108               | Brown        | Green       | 86.52           | 50.00               | 66.00        |
| 30   | 1,683    | 1,393           | 610                               | 175          | 150           | 112                       | 71                   | 51            | 31             | 33                    | 107                       | 91               | 142                  | 112               | Black        | Green       | 85.71           | 50.00               | 60.78        |
| 32   | 1,696    | 1,394           | 649                               | 189          | 145           | 106                       | 76                   | 52            | 33             | 31                    | 100                       | 85               | 142                  | 110               | Black        | Green       | 76.72           | 53.52               | 63.46        |
| 35   | 1,730    | 1,420           | 644                               | 174          | 149           | 108                       | 69                   | 50            | 35             | 30                    | 99                        | 90               | 136                  | 109               | Brown        | Blue        | 85.63           | 47.47               | 70.00        |
| 40   | 1,722    | 1,424           | 659                               | 173          | 161           | 113                       | 76                   | 46            | 34             | 33                    | 105                       | 90               | 136                  | 103               | Black        | Light brown | 93.06           | 55.89               | 73.91        |
| 40   | 1,637    | 1,360           | 630                               | 178          | 152           | 105                       | 73                   | 49            | 33             | 32                    | 108                       | 89               | 136                  | 99                | Brown        | Green       | 85.39           | 53.69               | 67.35        |
| 42   | 1,716    | 1,404           | 670                               | 186          | 146           | 99                        | 67                   | 49            | 39             | 26                    | 95                        | 88               | 131                  | 110               | Dark Blue    | Blue        | 78.49           | 51.13               | 79.59        |
| 43   | 1,790    | —               | —                                 | 173          | 139           | 110                       | 72                   | 57            | 34             | 32                    | 113                       | 92               | 130                  | 92                | White        | Hazel       | 80.35           | 55.38               | 59.65        |
| 45   | 1,694    | 1,420           | 685                               | 168          | 152           | 107                       | 66                   | 56            | 33             | 37                    | 110                       | 95               | 145                  | 117               | White        | Green       | 90.48           | 45.52               | 58.93        |
| 50   | 1,742    | 1,447           | 658                               | 172          | 151           | 103                       | 73                   | 52            | 29             | 31                    | 101                       | 91               | 145                  | 107               | Black        | Hazel       | 87.79           | 50.35               | 55.77        |
| 50   | 1,712    | 1,419           | 698                               | 185          | 153           | 100                       | 67                   | 47            | 36             | 32                    | 105                       | 93               | 139                  | 106               | Black        | Brown       | 82.70           | 48.23               | 76.60        |



Group IV.—*Levkoniko*—continued.

| Age. | Stature. | Sternal Height. | Trochanteric Height. | Tip of Middle Finger from Ground. | Head Length. | Head Breadth. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | Biorbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour. | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|-----------------|----------------------|-----------------------------------|--------------|---------------|----------------------|---------------|----------------|-----------------------|--------------------|------------------|----------------------|-------------------|--------------|-------------|-----------------|---------------------|--------------|
| 40   | 1,637    | 1,352           | 881                  | 681                               | 175          | 139           | 73                   | 53            | 31             | 30                    | 109                | 92               | 144                  | 103               | White        | Green       | 79.43           | 50.70               | 58.49        |
| 40   | 1,645    | 1,354           | 950                  | 675                               | 196          | 145           | 76                   | 55            | 35             | 29                    | 102                | 89               | 135                  | 108               | Black        | Brown       | 73.68           | 56.30               | 63.64        |
| 42   | 1,715    | 1,393           | 900                  | 646                               | 181          | 143           | 70                   | 54            | 38             | 33                    | 109                | 87               | 135                  | 111               | Brown        | Hazel       | 79.01           | 51.85               | 70.37        |
| 45   | 1,610    | 1,312           | 871                  | 620                               | 177          | 143           | 71                   | 51            | 38             | 34                    | 107                | 86               | 135                  | 108               | White        | Brown       | 80.79           | 52.59               | 74.51        |
| 45   | 1,700    | 1,387           | 920                  | 655                               | 173          | 146           | 77                   | 54            | 38             | 33                    | 112                | 95               | 135                  | 93                | Brown        | Hazel       | 84.39           | 57.04               | 70.37        |
| 45   | 1,664    | 1,366           | 876                  | 587                               | 171          | 152           | 62                   | 47            | 37             | 31                    | 106                | 84               | 134                  | 100               | Black        | Brown       | 88.89           | 46.72               | 78.72        |
| 45   | 1,723    | 1,426           | 917                  | 653                               | 184          | 154           | 70                   | 46            | 37             | 35                    | 103                | 85               | 137                  | 103               | Black        | Blue        | 83.70           | 51.12               | 80.43        |
| 55   | 1,755    | 1,458           | 933                  | 638                               | 178          | 142           | 72                   | 59            | 36             | 37                    | 102                | 87               | 137                  | 100               | White        | Blue        | 79.78           | 52.52               | 61.02        |
| 60   | 1,697    | 1,400           | 921                  | 596                               | 174          | 145           | 64                   | 54            | 43             | 38                    | 106                | 94               | 138                  | 110               | White        | Blue        | 83.33           | 46.38               | 79.63        |
| 60   | 1,670    | 1,350           | 872                  | 691                               | 181          | 137           | 72                   | 55            | 36             | 36                    | 105                | 88               | 131                  | 106               | White        | Green       | 75.69           | 54.96               | 65.45        |

| Age. | Stature. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour. | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|------|----------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------|-------------|-----------------|---------------------|--------------|
| 68   | 18       | 1,755        | 172           | 149                       | 74                   | 53            | 32             | 31                    | 107                       | 84               | 138                  | 102               | Green        | Brown       | 86.63           | 53.65               | 60.38        |
| 69   | 18       | 1,537        | 181           | 143                       | 58                   | 44            | 34             | 31                    | 102                       | 91               | 129                  | 124               | Black        | Brown       | 79.01           | 44.96               | 77.27        |
| 71   | 19       | 1,650        | 184           | 140                       | 75                   | 55            | 32             | 27                    | 105                       | 88               | 129                  | 90                | Brown        | Blue        | 76.09           | 58.14               | 58.18        |
| 72   | 19       | 1,675        | 178           | 157                       | 70                   | 47            | 37             | 35                    | 111                       | 98               | 137                  | 107               | Brown        | Brown       | 88.20           | 51.10               | 77.60        |
| 73   | 19       | 1,610        | 171           | 143                       | 64                   | 48            | 36             | 32                    | 108                       | 91               | 137                  | 104               | Brown        | Green       | 83.63           | 46.72               | 75.00        |

Group IV.—*Levkoniko*—continued.

| Age.            | Stature. | Sternal Height. | Trochanteric Height. | Tip of Middle Finger from Ground. | Head Length. | Head Breadth. | Minimum Frontal Diameter. | Upper Facial Height. | Nasal Height. | Nasal Breadth. | Intraorbital Breadth. | External Orbital Breadth. | Bimalar Breadth. | Bizygomatic Breadth. | Bigonial Breadth. | Hair Colour. | Eye Colour. | Cephalic Index. | Upper Facial Index. | Nasal Index. |
|-----------------|----------|-----------------|----------------------|-----------------------------------|--------------|---------------|---------------------------|----------------------|---------------|----------------|-----------------------|---------------------------|------------------|----------------------|-------------------|--------------|-------------|-----------------|---------------------|--------------|
| 39              | 1,786    | 1,481           | 964                  | 712                               | 175          | 151           | 111                       | 68                   | 44            | 38             | 36                    | 108                       | 95               | 138                  | 111               | Black        | Green       | 86.29           | 49.27               | 86.36        |
| 39              | 1,685    | 1,361           | —                    | 619                               | 183          | 145           | 97                        | 71                   | 53            | 37             | 30                    | 100                       | 92               | 138                  | 112               | Black        | Hazel       | 79.23           | 51.47               | 69.81        |
| 25 <sup>1</sup> | 1,750    | 1,453           | —                    | 673                               | 180          | 146           | 108                       | 68                   | 49            | 37             | 32                    | 107                       | 92               | 135                  | 97                | Dark brown   | Green       | 81.11           | 50.37               | 75.51        |
| 45 <sup>1</sup> | 1,587    | 1,319           | —                    | 652                               | 187          | 149           | 105                       | 70                   | 50            | 36             | 30                    | 103                       | 87               | 135                  | 115               | White        | Green       | 79.68           | 51.85               | 72.00        |
| 45 <sup>1</sup> | 1,686    | 1,394           | —                    | 631                               | 181          | 155           | 109                       | 79                   | 59            | 38             | 28                    | 104                       | 88               | 142                  | 112               | Going white  | Green       | 85.64           | 55.62               | 64.41        |
| 25 <sup>1</sup> | 1,663    | 1,390           | —                    | 610                               | 176          | 152           | 116                       | 70                   | 51            | 36             | 32                    | 109                       | 90               | 136                  | 102               | Brown        | Brown       | 86.36           | 51.48               | 70.59        |
| 30 <sup>1</sup> | 1,693    | 1,400           | —                    | 631                               | 185          | 147           | 112                       | 75                   | 58            | 36             | 39                    | 107                       | 95               | 139                  | 101               | Black        | Green       | 79.46           | 53.95               | 62.07        |
| 25 <sup>1</sup> | 1,750    | 1,400           | —                    | 670                               | 191          | 153           | 105                       | 67                   | 49            | 36             | 33                    | 108                       | 92               | 138                  | 105               | Black        | Hazel       | 80.10           | 48.56               | 73.47        |
| 20              | 1,598    | 1,310           | —                    | 626                               | 179          | 140           | 103                       | 63                   | 45            | 33             | 34                    | 103                       | 90               | 127                  | 103               | Brown        | Hazel       | 78.21           | 49.61               | 71.74        |
| 21              | 1,710    | —               | —                    | —                                 | 184          | 156           | 117                       | 67                   | 49            | 33             | 35                    | 119                       | 101              | 140                  | 113               | Black        | Brown       | 84.78           | 47.85               | 67.35        |
| 21              | 1,590    | 1,300           | 877                  | 616                               | 172          | 151           | 109                       | 70                   | 56            | 38             | 32                    | 109                       | 93               | 135                  | 105               | Black        | Brown       | 87.79           | 51.85               | 67.86        |
| 23              | 1,790    | 1,508           | 1,000                | 661                               | 175          | 149           | 109                       | 75                   | 58            | 39             | 30                    | 113                       | 93               | 137                  | 105               | Black        | Brown       | 85.14           | 54.75               | 67.24        |
| 28              | 1,758    | 1,406           | —                    | 662                               | 179          | 156           | 109                       | 69                   | 53            | 34             | 36                    | 107                       | 95               | 142                  | 103               | Brown        | Light brown | 87.15           | 48.60               | 64.15        |
| 28              | 1,835    | 1,540           | —                    | 703                               | 177          | 151           | 109                       | 71                   | 48            | 32             | 32                    | 109                       | 91               | 139                  | 105               | Brown        | Green       | 85.31           | 51.10               | 66.67        |
| 25 <sup>1</sup> | 1,720    | 1,445           | —                    | 684                               | 167          | 159           | 113                       | 71                   | 52            | 39             | 36                    | 111                       | 89               | 143                  | 107               | Black        | Brown       | 95.21           | 49.65               | 75.00        |
| 25 <sup>1</sup> | 1,684    | 1,386           | —                    | 675                               | 179          | 153           | 112                       | 74                   | 57            | 37             | 35                    | 107                       | 98               | 140                  | 114               | Black        | Brown       | 85.47           | 52.87               | 64.91        |
| 25 <sup>1</sup> | 1,631    | 1,334           | —                    | 622                               | 170          | 151           | 111                       | 65                   | 55            | 37             | 33                    | 103                       | 90               | 137                  | 103               | Black        | Brown       | 88.82           | 47.45               | 67.27        |
| 38              | 1,758    | 1,468           | —                    | 628                               | 170          | 148           | 107                       | 71                   | 56            | 37             | 37                    | —                         | 89               | 137                  | 105               | Black        | Green       | 82.81           | 52.81               | 66.07        |
| 28              | 1,661    | —               | —                    | —                                 | 182          | 148           | 112                       | 67                   | 46            | 39             | 33                    | 97                        | 89               | 136                  | 108               | Brown        | Green       | 84.32           | 49.27               | 84.18        |
| 43              | 1,790    | —               | —                    | —                                 | 173          | 139           | 110                       | 72                   | 57            | 34             | 32                    | 113                       | 92               | 130                  | 92                | White        | Hazel       | 80.35           | 55.38               | 59.65        |
| 19              | 1,704    | 1,391           | —                    | 654                               | 185          | 158           | 105                       | 80                   | 55            | 37             | 31                    | 101                       | 93               | 137                  | 107               | Brown        | Brown       | 85.41           | 58.40               | 67.27        |
| 20              | 1,590    | 1,300           | 827                  | 610                               | 189          | 141           | —                         | 66                   | 50            | 32             | 28                    | 107                       | 91               | 138                  | 110               | Black        | Brown       | 74.60           | 47.85               | 64.00        |





## MIGRATIONS OF CULTURES IN BRITISH NEW GUINEA.

*The Huxley Memorial Lecture for 1920.*

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MORE than seventy years ago Professor Huxley was assistant-surgeon on board H.M.S. "Rattlesnake," which was sent to survey Torres Straits and various parts of the coast of New Guinea. At that time he was more particularly interested in marine zoology, and one result of his travels was the publication of his monograph on "Oceanic Hydrozoa"; but we may safely assume that this memorable voyage was the immediate cause of the interest he subsequently took in anthropology.

In 1888 I went to the Torres Straits to study marine zoology, and mainly influenced by a conversation that I had with Professor Flower, I determined not to spend any time in investigating the natives; indeed, I had not previously paid much attention to anthropology. But circumstances, and the interest of ethnological research, proved too strong for me.

Thus, with an experience which is in some slight degree comparable with that of Professor Huxley's, it is perhaps not inappropriate that it has fallen to my lot to pay homage to the memory of a master of scientific method and of clear exposition. It is also not inappropriate that I should select the area of our respective first experiences in travel for the subject of this discourse.

On passing along the coast of British New Guinea, a traveller notices a series of cultures, some of which are evidently related to one another, while others are as obviously unrelated.

The differences between most of the allied cultures of the southern coast indicate that there is no immediate relationship between them, though their affinity points to a common origin. The source of this we shall now discuss. We may dismiss at once any idea of indigenous development, of cultural migration from Australia, or even from the west coast of New Guinea, the cultures of this latter area, as far as is known, being quite distinct from those we are now considering.

As we shall see, the cultural problems of the south-eastern peninsula and of the outlying islands are in the main quite distinct from those to the west, and the differences between the two groups of cultures indicate clearly that there cannot have been any extensive cultural movements from the Papuo-Melanesians to the western Papuans. If any movements had taken place in that direction it must



have been at a remote period of time, at all events anterior to the arrival of the Melanesian-speaking immigrants, but as no traces of cultures resembling those of the west now occur in the south-east, we may safely discard that hypothesis.

Outrigger canoes or seaworthy craft of any description are absent along the southern coast of New Guinea with the exceptions of the Torres Straits region and the Fly estuary, and the eastern portion of the Gulf of Papua; in the latter region it can, I think, be demonstrated that the outrigger canoes and double canoes are due to recent influences of the coastal Western Papuo-Melanesians. The problem of the outrigger canoes of the former area must be left for discussion elsewhere.

We are thus driven, on general grounds, to the supposition that the cultures of the southern coast of New Guinea came down more or less from the north, and I now hope to be able to adduce sufficient evidence to demonstrate the reasonableness of this supposition. Unfortunately, beyond some casual observations on the material culture of a few groups of peoples, we have no precise information concerning the inhabitants of the greater part of the interior of New Guinea, and extremely little about those of the districts immediately behind the coastal areas; and further, the socio-religious customs of the natives of many coastal areas have yet to be investigated. With these great gaps in our knowledge of the ethnography of New Guinea it is evident that any conclusions that may be now drawn can have but a tentative value, and that the lines of cultural drifts cannot be precisely mapped. Recognizing these limitations, my aim is to make an attempt to recover part of the unrecorded history of that fascinating island.

I shall now pass in brief review the main cultures of British New Guinea, journeying from west to east and then towards the north, and, while alluding to certain features of these cultures, I wish on the present occasion to lay special emphasis on the initiation ceremonies.

For obvious reasons I shall begin with the Kaia-kaia or Tugeri, who live on the Merauke river just within the boundary of Netherlands New Guinea. They are cannibals and inveterate head-hunters, who chew kava, *vati*. The inhabitants of several villages assemble at initiation ceremonies at which bullroarers are swung, but the bullroarer is not known elsewhere in Netherlands New Guinea. There are many dances at which masks are worn, and animals represented. The bullroarer is anthropomorphized as Sosom, a mythical monster of the bush, who at the annual festival at the beginning of the south-east monsoon devours the novices, but brings them back to life (p. 257). There is such a striking resemblance between this complex and that of various tribes in the area from Astrolabe Bay to Huon Gulf that a relationship cannot be denied. There are several indications high up the Fly of people who bear some resemblance to the Kaia-kaia, and there is figured in the *Leiden Rijks Ethnogr. Mus. Verslag*, 1902-3, Plate VIII, a disc-shaped stone-headed club, surmounted by a wooden fretwork, from the Tugeri, which precisely resembles those collected by D'Albertis from the Middle Fly. There are also other cultural



connections between these two areas, such as the general character of the arrows, and the use of circles and spirals in decoration, which demonstrate that at a relatively late period the Kaia-kaia crossed the Middle Fly and descended the Merauke to the coast.

The use of kava has such ethnological interest that it is worth while noting its distribution in New Guinea,<sup>1</sup> for doubtless, as in the Pacific, it has blazed a trail of cultural drift.

Several of the bush tribes west of the Fly estuary chew kava. The Masingle (Masingara), for example, who live behind Mawata, drink kava when they have anything important to discuss; at the great hunting dances the men dance in a circle round two effigies of crocodiles, Nugu and Ulbe its child, these are refreshed with libations of kava, *sic*, and are greased with pig's fat. In the legend about Nugu, it is stated that he originally ate the Masingle children, but refrained from doing so when the people promised to provide him with pigs; this seems to be a reminiscence of a monster who ate novices at the initiation ceremony (p. 257).

The Dirimu, who live on the eastern affluent of the Binaturi, have an annual pig dance, at which male and female human effigies, *udo*, are paraded. Kava, *gamoda*, is drunk at this ceremony and on other occasions, but only by fully-grown men and by women past the age of child-bearing. It is chewed by men only (T. Reeves Palmer, MS.). Mr. J. Bruce Freshwater informs me that the *udo* are kept in a house, *meta*, in the bush and taken to the men's house, *maia*, on the occasion of a feast connected with the planting of bananas. The *udo* are rubbed with the fat of pigs, and anointed with coconut oil.

There is no evidence that the Masingara, Dirimu, and other similar Papuan-speaking bush tribes were ever head-hunters or that they have a rich ceremonial life.

Kava, *gamoda*, according to Dr. Landtman,<sup>2</sup> plays an important part in several ceremonies of the Mawata people who migrated to the mouth of the Binaturi from Kiwai, perhaps about a hundred years ago. There seems, however, to be some reason to doubt whether the Kiwai people and other islanders of the Fly estuary were originally *gamoda*-drinkers, and the Mawata folk may possibly have learnt the custom from the Masingle.

Our knowledge concerning the ceremonial life of the Kiwai group of peoples is very scanty, and we must wait patiently for the publication of the information which Landtman has collected.

Landtman says that formerly there was in each village a men's house, *darimo*, in which many rites took place, especially those relating to war. In erecting a *darimo* various portions of a wild boar are inserted in corresponding places of the building, so that the whole house suggests the idea of a gigantic pig. Formerly the

<sup>1</sup> Haddon, A. C., "Kava Drinking in New Guinea," *Man*, Vol. xvi, 1916, No. 87. Beaver, W. N., *Unexplored New Guinea*, 1920, p. 92.

<sup>2</sup> *Man*, Vol. xvi, 1916, p. 148; "The Folk-tales of the Kiwai Papuans," *Acta. Sci. Fennica*, Helsingfors, 1917, p. 14; and in *Unexplored New Guinea*, p. 306.



erection of a *darimo* necessitated human sacrifices, and human skulls were kept in the building. There is a long and important initiation ceremony, *abere* or *moguru*, in the *darimo*, in which wooden human effigies, *mimia*, are employed, but at Mawata a single stone effigy was used. One chief feature of the ceremony is the hardening of the young men by means of fire. Landtman refers to two main elements in the *moguru*: the first forms part of the initiation and is primarily connected with fighting, the other includes certain sexual excesses to ensure productivity of food plants, more especially of the sago.<sup>1</sup> I was told at Iasa in Kiwai, where there is no separate *darimo*, that there were two initiation ceremonies: (1) The initiates are kept for three days in an enclosed spot in the bush where they are shown and taught to use the bullroarer, *madubu*, which ensures a good crop of yams, sweet potatoes and bananas. This takes place at the time when yams are planted in the south-east season. (2) The second *moguru* ceremony takes place during the rainy season. The novices are again taken to the bush when a large wooden image, *orara*, of a nude woman and similar small effigies, *umuruburu*, are shown to them, these secure a good supply of sago; the uninitiated may not see them. Between the *moguru* and the yam harvest the men make pan-pipes, *piago*, and every young man carries and plays one (this looks like a reminiscence of the sacred flutes).<sup>2</sup> Chalmers says that when the bullroarer, *burumamaramu* ("mother of yams"), is used and shown to the young men at the beginning of the yam season, all the uninitiated leave the village. Various effigies are shown to the novitiates at the *moguru*, fire is showered on them. This is a period of general license, "the more secret and immoral practices I cannot here repeat."<sup>3</sup> He also says that young men chew kava, *gamoda*, at feasts, but only those who have passed through all the stages of initiation may drink it, and they alone may wear the *kararo* mask, when they are called *oboro*, "spirits," of which women and children are terribly afraid.<sup>4</sup> I was told that a crocodile mask was worn during the *moguru*. It is clear that the sexual element enters largely into the *moguru*.

Kava is drunk by the Gogodara (Kabiri or Girara) who inhabit the low-lying district between the Fly and the Aramia affluent of the Bamu. The culture of these interesting people differs in several noticeable respects from that of their neighbours. At their principal ceremony, *moi-iata*, three large-named wooden effigies of crocodiles are exhibited and masks worn, marriages are celebrated, and youths initiated. The novice is previously hidden, and at the ceremony is placed in the large jaws of one of the crocodiles; the parents, by presents of food, persuade the chief sorcerer to implore the crocodile to restore the boy. Considerable attention is paid to human

<sup>1</sup> Landtman, G., "Papuan Magic in the building of Houses," *Acta Arboensia, Humaniora*, I., Abo, 1920; "The Folk-tales of the Kiwai Papuans," *Acta, Soc. Sci. Fennicae*, Helsingfors, 1917, pp. 339, 344.

<sup>2</sup> *Torres Stra. Reports*, Vol. v, 1904, p. 218, where further details will be found.

<sup>3</sup> *Journ. Anthropol. Inst.*, Vol. xxxiii, 1903, p. 117.

<sup>4</sup> *Reports*, p. 220.



heads; there is probably a manes cult, and elaborate paraphernalia are employed in ceremonies (p. 257).

The population of Murray Lake and the southern part of the area between the Fly and Strickland rivers has a culture which seems to have relations with that of the Kaia-kaia on the one hand and the Gogodara on the other, but we do not know anything about their socio-religious observances; we may expect to find among them kava-drinking and the symbolic devouring of initiates by a monster at the initiation ceremony.

On the coast of New Guinea, 300 miles due east of this last area, but separated from it by the unexplored central range of mountains, we find customs so similar, that, as I have already stated, a relationship must be postulated.

The *balum* cult is found among the Bakaua of the northern shore of Huon Gulf, the closely allied Jabim round about Finsch Harbour, the Tami Islanders, the Kai and other mountain people of the Rawlinson and Sattelberg ranges (Map III).

The term *balum* comprises (1) the secret cult of a mysterious being of whom the women are told that he is a greedy monster desiring the lives of young people, who has to be bought off with pigs, (2) the bullroarer which produces the voice of the spirit, and (3) the soul of those who have been dead a long time. Youths are initiated into the mysteries of the *balum* or circumcision feast at intervals of fifteen years in any one village, but held at intermediate times in villages elsewhere. The candidates spend some months in seclusion, subject to tabus, in a special house, *lum*. On the appointed day they are conducted away from the village with great noise and the swinging of bullroarers to the newly-built *balum* hut, which symbolically represents a monster; as the boys are dragged into the hut men emit growls and in this manner the boys are swallowed by a roaring monster. Bullroarers are swung and sacred flutes blown during the act of circumcision. The boys remain in total seclusion for several months and receive instruction. This account refers mainly to the Jabim, but it applies equally well to the Bakaua, who, as well as the Tami Islanders, are Melanesian-speaking people (p. 272). We are not informed whether the Kai and other mountain tribes drink kava.

We are told that the circumcision festival of the Papuan-speaking Bogadjim and Bongu of Astrolabe Bay is similar to that of the *balum* of Finsch Harbour; it takes place about every ten or fifteen years. This *asa* or *ai* cult centres in a poor sort of house, built in the jungle, containing wooden masks, *asa*-flutes and other ritual musical instruments; here are performed the ancestor cult, initiation ceremonies, and the sacred dances. Kava (*keu*) is drunk on all ceremonial occasions by the older men only; it is forbidden to uncircumcised boys and to women, but the boys chew the root for the use of the men.

Owing to the great distance of Astrolabe Bay and Huon Gulf from the Middle Fly, and the extremely difficult country that intervenes, it is not at all easy to understand how this cultural drift took place. I suspect that it descended some distance



down the Ramu and crossed the main range somewhere about 5° or 6° S. lat., reached the upper waters of the Strickland, followed the course of that river, crossed the Fly, and passed down the Merauke and other rivers to the coast. If the kava-drinkers had crossed the main range, south of the sixth degree of latitude, one would expect to find kava drunk by the tribes along the Purari and Kikori, but there is at present no record of this.

I have tacitly assumed that a direct cultural drift from east to west did take place, but, on the other hand, the alternative hypothesis is tenable that these eastern and western localities of kava-drinking are discontinuous relics of a much wider and more general distribution, in which case we must assume that this custom has been obliterated in the intermediate area by the spread of one or more later cultures. This hypothesis would fit in with that suggested by Rivers for Melanesia, where, according to him, the old kava culture of the Solomon Islands has been supplanted by the culture of the head-hunting "betel-people," though it has been retained in other parts of Melanesia.<sup>1</sup>

I now return to our survey of the southern coastal tribes. The people of Mawata, Turituri, and kindred villages, are immigrants from Kiwai. No evidence has been published to show when the Kiwai folk arrived in the Fly estuary; indeed, they claim to be aborigines. They were head-hunters, but not cannibals. They have elaborate initiation ceremonies, at which bullroarers, masks and human effigies are employed, and these, as we have seen, are intimately associated with ensuring the fertility of garden produce, but training in warfare was till very recently an important element, and there is a manes- or ancestor-cult.

The Torres Straits Islanders are a mixture of at least two stocks and their culture consisted of several strata, but in the main it belonged to that of the Kiwai group, though there were traces of a Papuan "bushman" element.

The Fly River and its affluents constitute an obvious channel for migrations. Unfortunately, our knowledge of this great river system is very slight and is confined to a limited number of material objects; of the socio-religious life we are profoundly ignorant, except for the region of the estuary.

We are justified in recognizing in this area at least three distinctive cultures which may themselves be complex, and doubtless there are others.

These are :—

- (1) The Kiwai culture.
- (2) The culture of the middle region of the Fly—or roughly the banks of the Fly and the Strickland and the country lying between them, including Lake Murray; it extends from about 7° S. lat. to Everill junction. This is characterized by men's ceremonial houses, superficially like those of the Purari but partitioned inside, trophies of stuffed human heads, large hour-glass-shaped handled drums, stone-headed clubs with carved wooden

<sup>1</sup> *The History of Melanesian Society*, 1914, II, pp. 259, 260.



tops (*baratu*), carvings on trees, a distinctive type of decorative art in which vegetable forms appear to play a great part, combined with spirals. The people smoke tobacco and chew betel.

- (3) The culture of the upper Fly northwards from about D'Albertis junction and including the Alice and Palmer rivers (Map IV). This is characterized by square houses on piles, sometimes built round trees, with doors and windows, internal compartments and sunken fireplaces; cylindrical drums, usually with two "jaws"; fire made by the strap-saw method. The people make good gardens, grow taro, smoke tobacco, chew betel; the men wear a nut and the women have fore and aft petticoats. The most noticeable features are the strong ratan cuirasses worn by the warriors, and a female desiccated corpse ("mummy") found by D'Albertis on the Palmer River.

At present it is difficult to disentangle the mutual relations between the cultures of the Fly and Bamu estuaries, owing to constant intercourse and consequent overlapping. One distinction seems to be clear in the cannibalism of the Bamu tribes. The Kuria, who live a short distance up the Bamu river, wear, in their initiation ceremonies, basket-work masks, *kauwai*, which represent long-snouted human faces. Beaver<sup>1</sup> compares these with a similar mask from Dopima, Goaribari Island, but as early as 1902 Foy<sup>2</sup> drew attention, in a paper on the ethnographical relations between British and German New Guinea, to such masks, which were to be found in German museums though none had come to England, and he referred to their close similarity with masks from the Sepik (Kaiserin-Augusta-Fluss). I have pointed out the close connection between the culture about the mouths of the Bamu and that of the Kerewa villages of Goaribari Island and the neighbouring mainland and islands; the employment of a skull shrine, *agiba*, and its smaller representative, *gope*, of the Bamu estuary, may be taken as a criterion of this culture.<sup>3</sup> The only account of ceremonies in these two regions are those by Flint of a *muguru* on Damera Island in the Bamu estuary, in which sexual demonstration and instruction seem to be predominant features of what is apparently one phase of an initiation ceremony, which is also utilized for marriage payments (p. 258).

Ryan describes, what he doubtless correctly terms an initiation ceremony, in the married men's house, *dubu daima*, of the Goaribari, though it is equally a marriage ceremony, but there are probably other initiation ceremonies yet to be recorded (p. 23). I was told that sexual dances, *buguru*, take place there too. We do not know how the masks of this area are employed. In dealing with the *agiba* cult of the Kerewa culture I gave several examples of the connection of the culture of the Bamu-Kerewa peoples with that of the lower and middle Sepik.

<sup>1</sup> Beaver, W. N., *Unexplored New Guinea*, 1920, pp. 227, 228, pl. p. 224.

<sup>2</sup> Foy, W., *Globus*, Vol. lxxxii, 1902, p. 379.

<sup>3</sup> *Man*, Vol. xviii, 1918, No. 99.



Since there are numerous ethnographical objects, and doubtless customs as well, that are common to the north of New Guinea and the basins of the Fly, Bamu, and other rivers, it is of some interest to discover how they could have passed from one area to the other (Map IV).

The great Sepik River affords a convenient route for coastal cultures to reach the interior. A German map of 1917<sup>1</sup> shows that the Sepik rises from the Victor Emanuel mountains of the main range about 141° 45' E. long., and south of 5° S. lat. it curves northwards about 141° E. long. and flows just south of 4° S. lat. in an easterly direction to the sea. The Palmer affluent of the Fly rises from Mounts Donaldson and Blücher of the main range at about 142° E. long. and 5° 20' S. lat., and the Strickland rises twenty or thirty miles to the east from the Muller mountains. An affluent of the Middle Sepik rises about 142° 30' E. long. and 5° S. lat. So there are at least two possible routes from the Sepik system to the Fly system, which tap different cultures along the former river. The Kikori rises from the main range about 142° 30' E. long. and about 6° S. lat., and the Turama rises between the Strickland and the Kikori. Granting passes across the main range, there does not appear to be any great difficulty in cultural drifts taking place from north to south, the intervening distances are probably only about thirty miles or so. The Ramu and the Purari form a similar possible means of communication between the north coast and the Gulf of Papua. The latest (1920)<sup>2</sup> German map, based on Detzner's observations, of the interior behind Astrolabe Bay and Huon Gulf, shows that the main range forms a well-defined watershed for the rivers flowing north and south, and probably this obtains throughout. The interior between the Sepik and the western part of the north coast is unexplored. These north and south culture drifts cut across the east and west kava tract, unless future investigation shows that it followed a similar course.

Nothing can be said here about the Urama district, which extends from Paia inlet to Era Bay; the language is said to be allied to that of the Kerewa. Women are not allowed to enter the large *ravi* or men's houses, though they visit the *dubu-daima* of the Kerewa; in the *ravi* are great masks, and skulls are kept in pigeon-holes inside the cubicles (Map III).

The Naman inhabit the Purari delta from Era Bay to the Alele, or eastern mouth of the Purari; their culture is so similar to that of the Elema tribes to the east that there can be no doubt as to their common origin, but the *kopiravi* cult is peculiar to the Naman and is so distinctive as to separate the two groups. The *kopiravi* are basket-work monsters which are placed in the screened-off end of the great ceremonial houses, *ravi*. No detailed account has been published of the ceremonies of the Naman. Their religion appears to be a combination of totemism, head-hunting, cannibalism and a manes- or ancestor-cult, associated with which are ceremonial tablets, masks and bullroarers. The *kopiravi* may prove to be the effigies of spirits

<sup>1</sup> Behrmann, W., "Der Sepik," *Ergänzungsheft Nr. 12. Mitt. aus den Deutschen Schutzgebieten*. Berlin, 1917; Schultze, L., "Forschungen im Innern der Insel Neuguinea," *Ergänz.* Nr. 11, *ibid.*, 1914.

<sup>2</sup> *Zeitschrift der Gesellschaft für Erdkunde zu Berlin*, 1919, No. 7/8.



(possibly ancestral), who may be regarded as gods. It would not be surprising if there is some connection between the *kopiravi* and the monster who eats initiates, but in this instance, so far as our evidence goes, the monsters seem to be concerned solely with head-hunting and cannibalism (p. 260).

A great deal has been written about the coastal peoples of the Gulf of Papua, but practically all of our systematic information is due to Holmes, and it is from him that most of what I have to say has been obtained (p. 260).

Elema is a convenient name for the coast district between the Alele mouth of the Purari and Cape Possession. Tradition relates that the different tribes migrated at various times from the upper waters of the Purari and southern slopes of the Albert Edward Range, and reached the coast by diverse routes. The distinctive culture of the Namau appears to be an earlier phase of the same southerly trend. Holmes considers that of the group of Elema tribes whose names end in *ipi*, the Moreaipi settled on the coast about A.D. 1800, or perhaps somewhat earlier, while the Toaripi did not actually reach the sea till about 1850; with these migrations may be associated, without doubt, the ceremony of investing novices with the *kovave* mask, and probably other ceremonies in which masks are employed. The ceremonies in which human-face masks are worn are clearly associated with an ancestor cult, and it also appears that certain ancestors have been apotheosised. Masks are also connected with a war cult and with the observances which take place in the large ceremonial houses, *eravo*. There are probably other elements in this complex which hitherto have escaped attention. The long-drawn-out and elaborate initiation ceremonies are very typical; during an early phase the novices are introduced to Kovave, the mountain god, whose hunger has to be appeased by a gift of large quantities of food and pigs—this suggests a reminiscence of the *balum* monster. It is also significant that the front of an *eravo* suggests to the native mind the face of a warrior, although travellers have likened it to the mouth of a crocodile. In this respect there may be some indirect connection with the fine ceremonial houses on the Middle Sepik, in the gable of which is represented a huge human face with gaping jaws.

The barren hilly region of Cape Possession, as I pointed out long ago, is the boundary between two very different groups of cultures.<sup>1</sup>

Beyond Cape Possession most of the tribes living in the coastal districts speak "Melanesian" languages, of which Motu is the best known and most widely used. There is no doubt that many of these peoples are descendants of an overseas migration mixed to a greater or less extent with the aboriginal population, but certain coastal tribes such as the Koita (Koitapu), are essentially of native descent. The culture the immigrants brought with them colours the whole coast, but there is reason to believe that the really important ceremonies belong to the Papuan substratum.<sup>2</sup>

<sup>1</sup> Haddon, A. C., "The Decorative Art of British New Guinea," *Cunningham Memoir*, x, Royal Irish Acad., Dublin, 1894, pp. 89, 258; *Evolution in Art*, 1895; *Geog. Journal*, Vol. xvi, 1900, pp. 265, 414.

<sup>2</sup> My information is derived from Seligman, C. G., *The Melanesians of British New Guinea*, Cambridge, 1910.



The inhabitants of the coastal plains from Cape Possession to the Angabunga, such as the Roro and the Mekeo of the alluvial plains of that river, exhibit clear traces of influences from the Elema culture. For example, the decorated club houses, *marea*, of the Roro and Mekeo, and the occasional use of masks, spreads down even as far as Hisiu in Redscar Bay, and Strong<sup>1</sup> has noted that the clan system and club houses of the Kapatsi (Kabadi), inland from Galley Reach, resemble those of the Roro (Map V).

The open ceremonial platforms, *dubu*, constitute an important element in the social life of the Koita, Motu, and allied tribes, who stretch from Redscar Bay to Kapakapa; the *dubu* being best developed among the Sinaugolo, Garia, and related tribes, who live inland from Kapakapa (Gabugabu). The Sinaugolo state that in the course of their coastward wandering their ancestors brought with them a carved *dubu* post from Mount Taborogoro, a spur of the main range. Seligman pertinently remarks that it is reasonable to believe that the *dubu* and its associated customs, which are most vigorous in the hill zone behind the coast, never took any firm hold of the purest of the Motu immigrants. The *dubu* has a close association with ghosts, who visit it at feasts to eat the shadow of the food. There were no skull trophies in this area.

The *tabu* is probably the most important feast of the Koita, Motu, and neighbouring peoples, and it occurs as far as the Hood Peninsula. It is associated with the building of a new *dubu* or the renovation of an old one. There are certain preliminary ceremonies of local significance, games are held, including a tug-of-war, men against women, also a number of village men and unmarried girls ascend a platform, *pata*, on which food is festooned, the girls keep their feet still but sway their petticoats and bend their bodies above the hips. By the great day enormous quantities of food, including pigs, are affixed to the *dubu*, then visitors come from far and near, but may not enter the village till a conch shell has been blown on the *dubu*. The usual feasting and dancing follow. A boy may be given his first perineal band by his maternal uncle on this occasion; this is a purely family affair, and is said to have no necessary connection with the *tabu*, but, all the same, I expect it has.

The district from Kapakapa to Aroma is characterized by steeple-houses, *koge*, upon which skulls were hung; or they were fastened to a *dubu* platform, for when a house decays its platform may persist as a *dubu*. On the whole, the social life and customs of this group agree with those of the Koita and allied tribes. The *kapa* is an annual feast at which recently tatued, highly decorated nubile girls mount a *dubu*; they then doff their petticoats and are anointed with oil by an old woman; two or three married women seat themselves on the *dubu* behind the girls and beat drums, to the rhythm of which the girls cut up yams and finally pelt the crowd with areca nuts. It seems that there should be a presentation pig for each girl. The

<sup>1</sup> *Loc. cit.*, p. 27.



*kapa*, besides being a maturity ceremony for girls, also ensures the productivity of the gardens; it may be regarded as a special local development of one disassociated phase of an initiation ceremony.<sup>1</sup>

As the Mekeo district is an overlap area between the cultures of the Gulf Papuans and of the Western Papuo-Melanesians, so the Amazon Bay district is an overlap area between the cultures of the latter and those of the Southern Massim group of the Eastern Papuo-Melanesians (Map II).

The Mailu,<sup>2</sup> who inhabit Toulon Island (Mailu) and the country around Milport Harbour and Port Glasgow, are Papuo-Melanesians, but they speak a "Papuan" language, their social constitution and the essential features of their culture are of the same type as those of the Koita. Formerly each clan had its *dubu*, which was merely an ordinary house appropriated solely to the men; in it the novice was confined for a time, and one of his duties was to clean the skull of a freshly killed enemy. The great annual feast, *maduna*, forms a central feature in the social and mental life of the natives; in this respect it resembles the *tabu* of the Koita, or the great annual feast of the Sinaugolo. Malinowski states that the Sinaugolo and kindred peoples stretch as far east as inland of Cloudy Bay, where there is an annual feast of much the same kind as among the coastal Mailu. Again, going east, festive ceremonies of the same type are stated to exist among the Udama, inland of Amazon Bay and Port Glasgow, and among the tribes living inland of Orangerie Bay. He was also informed that the people of non-Massim stock inland of Mullens Harbour know more about the sacred dances than the coastal people of that district; he is convinced that the *maduna* and the *walaga* of Bartle Bay are varieties of the same ceremonial institution, and of this there can be no doubt.

The most important of the *maduna* ceremonies is the fasting period, *udini*, which begins by bringing with great noise and ceremony two mango saplings into the village; there is also a ceremony of eating betel nuts, then the saplings are cut into a number of pieces to form charms to ensure an abundance of pigs. The final feast is attended by visitors from far and near. The pigs given at the feast are mainly return presents for bride-prices. The *maduna* is held by several villages in rotation (p. 265).

Very little has been published concerning the ceremonial customs of the peoples of the extreme south-east of New Guinea and the islands beyond, but Malinowski informs me that the natives of the islands of Rogea, Sariba, Basilaki, etc., speak the same language and may be termed the Su-a-u tribe, and with differences, such as the local presence or absence of cannibalism, constitute one cultural and sociological unit. Their sociological cohesion is illustrated by the annual feast, *so'i*, which is held first in one village, and after that is over some of them pass on to another place. A new house is always built in the hamlet for the feast, and a platform and

<sup>1</sup> Guise, R. E., *Journ. Anthropol. Inst.*, Vol. xxviii, 1899, p. 215; Haddon, A. C., *Head-Hunters, Black, White and Brown*, London, 1901, p. 217.

<sup>2</sup> Malinowski, B., "The Natives of Mailu," *Trans. Roy. Soc. S. Austr.*, Vol. xxxix, 1915, p. 494.



temporary shelters. Conches are blown on the arrival of a party of decorated visitors by land or sea, the men try to uproot fruit trees by blows with the poles to which pigs are attached. A mango sapling is ceremonially carried in front of the pig bearers by decorated women, who also bear stone axes in ornamented handles; the men with shouts and threatening gestures throw spears into the gable and thatch of the house to whose owner a pig will be given, and the pig is laid in front of the house. Some of the numerous pigs are killed and their flesh distributed. Ceremonial dancing takes place in the afternoon. A *so'i* feast is always associated with the death of a man from the hamlet in which the feast is held. The distribution of food is carried out in fulfilment of certain obligations arising from the death of the man; other types of presents and payments also take place. The ceremonial dances which have to take place at each feast are said to have come originally to the coast natives from the mountain tribes living inland of Orangerie Bay. Malinowski points out that this feast is the equivalent of the big mortuary feasts described by Seligman: the *soi* of Tubetube (p. 584), the *toreha* in Milne Bay (p. 632), and the *torela* in Bartle Bay (p. 635). Feasts called *so'i*, consisting of a distribution of pigs and valuables, preceded by a period of *tabu* and associated with a previous death of a notable, are held among the natives of Dobu and the neighbouring parts of Moratu and Duan (Fergusson and Normanby Islands), as well as in Murua (Woodlark) and the Marshall Bennet Islands, which are the boundary in the Massim area of this type of feasts. The feasts of the Trobriands present entirely different characteristics. Malinowski adds that it is important to note that undoubtedly the Trobriand Islanders show hardly any traces of an influence from the Papuan mainland, and that they are the purest representatives of the immigrant culture. Although the *soi*, etc., is the final mortuary feast, I am inclined to regard it as a detached variant of a feast that originally had elsewhere a more general character.

The modifications and simplifications of social life and custom induced by the migration of Melanesian-speaking folk into the Massim area are sensibly weakened in Bartle Bay, though the people there must be classed as Southern Massim. The initiation of the lads is a simple affair, but the *walaga* feast, or cult of the mango, is the most important ceremony in the district, as it brings together from a great distance even hostile communities. The name is derived from the great dancing platform built for the occasion in the bush, with the aid of all the medicine men from the neighbouring mountains. The headman and others of the clan giving the feast are holy and have to fast, they cut down a wild mango sapling with such care that neither it, nor any chips or leaves, touch the ground; with great ceremony it is taken to the platform and fastened to a high central pole. Guests bring pigs to the feast, and these are killed slowly so that there may be much squealing, which pleases the mango tree, for otherwise crops would fail, and pigs and women be barren. The tree is preserved, but on certain ceremonial occasions a piece is broken off and burnt until it is totally destroyed, not till then may that community have a new *walaga*.



In some ill-defined way this ceremony is associated with the ghosts of the dead, as it seems to be the final culmination for all death feasts (p. 266).

At Wamira in Bartle Bay in olden days initiation ceremonies for boys were celebrated every three or four years at the time of the flowering of a certain rush. Each boy scrapes an unripe mango into a coconut shell and mixes it with salt water to drink. The lads build a sleeping house, *potuma*, apart from the village. For four to six months the novices live in partial seclusion; they work in their gardens, hunt and fish, but they may not eat their kill. Old men visit the boys and instruct them. A public hunt marks the termination of the period, the boys resume their old belts and decorate themselves, and, for the first time, may wear a comb. At Gelaria, some six or eight miles inland among the mountains, the lad remains at home, and is subject to various tabus for one year; at the end of the period a feast is held at which the father publicly combs the hair and blackens the face of the boy. Formerly at Wamira there was a partial seclusion in a house for girls about the time of puberty; all flesh was tabued to them.<sup>1</sup>

There is a great dearth of information about the ceremonial observances of the natives of the coast, or of the interior, till we come to the region between the main range and the coast, and from about 8° S. lat. to the Hydrographer's Range. For our knowledge of what occurs in this district, we are indebted to Beaver, and especially to Chinnery. Three groups of peoples may be distinguished: (1) the Mountain People, (2) the Bush Orokaiva, and (3) the Coastal Orokaiva (Map V).

(1) The Borli of the watershed of the Waria have an initiation house, *guhu-bora*, in which lads are secluded with the usual tabus and swinging of bullroarers, *bora*. Tests of moral restraint are imposed, and at the completion of the seclusion a great feast, *ohoa*, is given in the *guhu-bora*, and the novices are instructed in the use of the *bora* and of the sacred flutes. Initiation among the Mawai somewhat lower down the river is very similar, the same respect is paid to the bullroarer, *bui*; the elders are also called *bui*. At the terminal feast each boy stands on a dead pig, and is decorated. After a probationary period for a month the boy is steamed, and, standing on a dead pig, is invested with a loin-cloth (p. 268).

(2) The Koko, in the neighbourhood of the Yodda, initiate boys and girls at the same time. They have previously been secluded in houses, *thrar*, in the bush. Bullroarers, *wuwu*, are swung, and eventually there is an exciting ceremony in connection with a scaffolding on which the children are roughly handled. Spirits, who are probably dead ancestors, are entreated not to kill the children, the bullroarers are explained to the children, who then return to their respective *thrar*. Here they are subject to tabus and penalties, they receive instruction, and the boys are told that they must kill someone; the boys play pairs of sacred flutes in the *thrar*, and, we are told, the girls do the same, but elsewhere such flutes are intensely sacred and may not be seen by women or children (p. 270).

<sup>1</sup> Seligman, *loc. cit.*, pp. 494-498.



(3) Initiation is general throughout the Coastal Orokaiva; that of the Binandele is said to be typical. An initiation house, *oro*, is erected in the bush, each post of which, as it is raised and cut into shape, is addressed in the name of a deceased relative, who is invited to attend the dance, *ia*. Invitations to the feast are sent to neighbouring villages, and the chief feature of the ceremony is the production by the hosts and guests of varied and realistic plays. Each child stands on a pig, and is instructed; the boys are also invested with the perineal band, and a further probational period ensues.

Among the Goi-efu, who live on the northernmost slopes of Mount Yule, the children arrive at adult status by stages; the ceremonies connected with these are conducted with some elaboration and tabus are enforced. On reaching puberty, the boy, in the presence of the community, stands on a dead pig, is invested with the perineal band, and is given instruction. He is obliged to celebrate his initiation by killing a man or wild pig immediately afterwards. Girls go through an analogous ceremony (p. 269).

We may now pass to the Mambule (Mafulu) of the upper waters of the Angabunga, who have been admirably described by Williamson (p. 271). They are admittedly a people of Pygmy and Papuan descent, who are probably influenced by Papuo-Melanesian culture. They have affinities with the natives who live on the Chirima affluent of the Mamba on the east side of the main range, and it is possible that they have trading relations with the natives of the Upper Waria. There is no system of seclusion at puberty, no elaborate initiation ceremony, no wearing of masks, nor use of bullroarers. When boys and girls are invested with the perineal band they stand on dead pigs. A similar ceremony takes place before the boys or girls may enter the *emone*, or club house, but the girl may not sleep there, nor may she frequent it after she has been invested with the perineal band. The "big feast" is held at intervals of about fifteen or twenty years, when a new *emone* is built. Food and skulls are fastened to posts. If one does not already exist, a box-shaped burial platform is built to contain the skull and bones of a chief. This is eventually cut down, never to be rebuilt.

The ceremonies of admission to the *emone*, the assumption of the perineal band, and of the right to beat a drum and to dance, all alike in essential details, take place at the "big feast," or at other times. As this feast occurs at long intervals these privileges would rarely be obtained, and social status would be retarded if the requisite rites could only then be performed. This seems to be an adequate reason for the dislocation of these minor ceremonies, at least this is how it appears to me, and not that these minor rites were added to the great ceremony.

On taking a general survey of these facts it would seem that a periodic great feast is the most important factor in the social life of the people in the south-eastern peninsula of New Guinea; it is attended by neighbouring or distant people, and even sometimes by enemies; it is impressive, and is regarded with veneration.



The absence of masks sharply distinguishes it from the western ceremonies we have considered. The main features of what may be taken to be the complete cycle of ceremonies appear to be :—

- (1) In the north, seclusion, during which bullroarers and often sacred flutes are heard.
- (2) The building of a ceremonial platform on which the novices are placed, where (in the north) they are subjected to ill-treatment, and on which the older people dance.
- (3) In the south the mango sapling is treated with great reverence and fastened to the platform. It represents a mythical being who substituted pigs for human sacrifice at the feast, and the squeals of the dying pigs ensure fertility in crops, pigs, and women.
- (4) In the north the children stand on dead pigs when invested with the perineal band, but in the south this operation is generally performed with less ritual.
- (5) In the north the use of bullroarers and of sacred flutes is explained, and another period of seclusion occurs.
- (6) The great feast, at which there are various ceremonial and social dances, and (in the north) what may be described as dramatic performances.
- (7) The spirits of the dead may be invoked when building the ceremonial house or the platform, and there seems to be a general belief that these are present at the final feast; indeed, this element appears to predominate in some places, and it lingers even when the ceremony as a whole has become attenuated.
- (8) There is also a general feeling, at all events in the north, that the novice must prove his manhood by homicide.

It thus appears that more elements of this theoretical cycle of events occur in the north than in the south, which points to the conclusion that this indicates the direction of the cultural migration. We know that there have been at least two important migrations of people from Melanesia into the south-eastern peninsula of New Guinea which cannot fail to have had an influence on what we may fairly consider to be the older culture.

The great feast is so elaborate and requires the collecting of such an enormous amount of vegetable food and the fattening of so large a number of pigs, that it can be held in a given place only at long intervals. I have already suggested that this seems to be a reason why the initiation rites may be detached from it, or, when they take place at it, why they appear to be of secondary significance. The influence of the immigrants may have tended to weaken the significance of initiation, for, as a rule, it comes to be reduced to the tying on of the perineal band. The idea of marriage or of general fertility seems to cling to the feast, probably because marriage is a consequent upon initiation, or upon the simple tying of the perineal band, which



may be regarded as the vestige of a fuller rite. And though the need for initiation may decrease, marriage always remains a social necessity. Also of great social importance is the maintenance of the valour of the younger men. The integration of novices into the social group of grown men is frequently associated in various parts of the world with a recognition of kinship with the spirits of the dead clansmen, but this element is likely to be weakened under the influence of alien immigrants. On the other hand, the *maduna*, *so'i*, etc., of the Massim area forms the final mortuary ceremony, and appears to have but little other significance. There seems to have been some connection between the death-dance and initiation at Mabuiag, Torres Straits.<sup>1</sup>

The prominence of the mango tree in the south is perplexing, for though mangoes are a common food and much liked, they do not appear to be sacred in any way, or to be connected with garden magic. Among the Bush Orokaiva trees are pulled down, and the children are told that this is done by spirits; again, the basis of the construction of a *balum* hut is a complete areca palm. The ceremonial knocking-down of three trees specially erected in the village for the great feast is a prominent feature in the Mafulu ceremony; and attempts to uproot fruit trees occur in the *so'i* of the Massim peoples, but this may be only a case of the destruction of property and food plants, which is a widely-spread funeral custom.

The use of the bullroarer is important. In the south-eastern peninsula it is practically absent from all the coastal regions, but it is said to occur at Awaiama and Taupota in the east of Bartle Bay. It occurs among the Bush but not among the Coastal Orokaiva, and it also occurs among the mountain tribes from Mount Victoria northwards. Neuhauss states that the bullroarer plays an important part in the circumcision feast only in Huon Gulf. On the north coast the bullroarer is well known, but it has principally the significance of a love charm, its place in the circumcision feast being taken by long flutes.<sup>2</sup>

Of great significance is the employment of sacred flutes, which are played two at a time. They occur among the southern Bush Orokaiva, and among the mountain tribes of Mount Lamington and those north of Mount Albert Edward; also down the Waria River, and probably all along Huon Gulf. They are also a prominent feature in the *balum* ceremonies of the Kai, Bukaua, Jabim, Tami Islanders, and other peoples. Their use extends along the whole north coast and into Netherlands territory as far as the Nimburan, who live inland south of Matterea Bay. They are also used a long way up the Sepik and up the Keram. Their distribution coincides very closely with that of the great slit wooden gong, except that the latter has not been recorded south of the northern shore of Huon Gulf; Rivers, however, allocates the slit gong in Melanesia to the "Kava people."<sup>3</sup>

<sup>1</sup> *Reports, Camb. Anth. Exped. to Torres Straits*, Vol. v, pp. 213, 252.

<sup>2</sup> Neuhauss, R., *Deutsch-Neu-Guinea*, Berlin, 1911, Vol. i, p. 156.

<sup>3</sup> *The History of Melanesian Society*, II, p. 460.



A study of the western initiation ceremonies and of the "great feast" of the south-eastern peninsula leads us to look for their source to the more northerly regions of New Guinea.

I have alluded (p. 241) to the *balum* cult of the coastal people on the north of Huon Gulf, and though kava appears to be totally unknown to the inhabitants of the south-eastern peninsula, there are so many points of resemblance between the *balum* cult and the initiation ceremonies of the peninsula that we must admit of a cultural connection.

The Kai are a people of mixed Pygmy and Papuan descent, who speak a Papuan language, and inhabit the Rawlinson and Sattelberg ranges north of Huon Gulf. They build a long hut, tapering away behind, for the circumcision festival in the jungle, and no woman may go near it. It represents Ngosa ("Grandfather"), a monster who swallows the novices. In this hut are kept the bullroarers, *ngosa*, which are employed in the ceremony; only the old men have access to them. The circumcision dances are true Kai dances, and some may be very old, but they borrow certain dances from elsewhere. Keysser<sup>1</sup> gives a general description of the ceremony and a short account of the puberty ceremonies of the girls, which include confinement to the house and tabus.

The Tami Islanders to the north of Huon Gulf are much purer Melanesians than their neighbours on the mainland, and in their ceremonies they employ masks, which are elsewhere only met with west of Cape King William (about 6° 5' S. lat.).

*Kani*, which is the same as the *balum* of the Jabim, is (1) a spirit invoked at circumcision, to which also belong mask-spirits, *tago*, in Tami, Siassi, and Maligep (west New Britain), and the wooden masks, *ngaboyo*, of Rook Island; (2) the spirits of the dead. The institution of the bullroarer, *kani*, was introduced later. *Kani*, whom the bullroarer or mask is supposed to represent, is described as a dragonlike monster, invisible to women, who swallows youths, and is spoken of as "lord" by the uninitiated. The Tami say that the *kani* cult was forced on them by the mainlanders, apparently about 150 years ago, before which time circumcision was not practised. The cult extends to Siassi and Rook Islands and to Maligep; the bullroarer is also known on Gazelle Peninsula. The mystery becomes less the farther the islands are from New Guinea—thus the Tami women know all about it, though they have to pretend not to, and on Siassi and Rook the women may see it. Latterly circumcision takes place only about every twenty years, grown men and infants are among the candidates. The details given by Bamler correspond with those on the mainland. Every village has a number of bullroarers for ceremonial and general use; the latter appear to be generally transmitted by the maternal uncle, similarly the sons of a Maligep woman living in Tami got *tago* spirit-masks from their mother's brothers and cousins. The circumcision long hut represents a monster. *Kani* is summoned with a tremendous noise of bullroarers; his wives are represented by three bamboo flutes, a long and shorter one are piston-

<sup>1</sup> Keysser, C., "Aus dem Leben der Kaileute," in Neuhauss, *Deutsch-Neu-Guinea*, Vol. iii, p. 1.



flutes, the third is a long thin bamboo with two holes for the fingers. The oldest religious stratum appears to be that of the *tago* spirits, who were created with their respective families or classes, those of the oldest families being most respected. *Tago* are represented by masks which are kept in a hut in the bush, where women and children may not go. When men dressed in the *tago* masks appear, a tabu is placed on all coconuts for one year, during which time there must be peace; this happens about every ten or twelve years. *Tago* is the same as the *dukduk* of the Bismarck Archipelago, Siassi and Tami are outposts of that cult. On Siassi and Rook, and probably on other northern islands, are light wooden masks which represent *kani*; on Rook a bullroarer is used as the "tongue" of the spirit; here the mask is original, and the bullroarer a late addition.<sup>1</sup>

At the Papuan villages of Sialum and Kwamkwam, in the neighbourhood of Cape King William, the only spirit cult is *mate*, but the people will not speak about it for fear of the inlanders, who are the real owners of *mate*. This cult seems to be much the same as the *balum* cult, but the associated circumcision is falling into disuse; most of the spirits included under *mate* are ghosts of ancestors and of the recently dead.<sup>2</sup>

Most of the scanty information from Astrolabe Bay has been obtained at the Papuan village of Bogadjim, all the other coast villages except Bongu are Melanesian-speaking. When circumcision takes place bullroarers are used, which are of varied form and decoration, and differ from those of Huon Gulf; unperforated ones are in common use as love-charms, and are given by the girls to the young men. Biro states that the *asa*-house (see p. 241) was formerly the only place for performing ceremonies, but that latterly, though not from European influence, *asa*-houses are more or less neglected, being replaced by the men's house.<sup>3</sup>

I have not been able to find any full account of an initiation ceremony between Astrolabe Bay and Humboldt Bay, but there is some information about the Monumbo, a Papuan-speaking people living about Potsdam Harbour (145° E. long.). They have dances in a remote place in which men wear masks, *murup*, and personify *murup*, who inhabit the primeval forests of the Ramu and Sepik valleys; women and children may not approach the spot, or the *murup* will kill them. The long sacred flutes, *murup*, are kept carefully concealed in the men's houses; they are blown on the completion of a chief's house, at initiation, and after burial of the male dead; the women are told that their noise is the cry of the *murup* monster who kills women and children. From a rite that takes place, it would seem that the flutes have some connection with procreation.<sup>4</sup> Pösch says that the songs, dances and ceremonies of the Monumbo came from the low country between the Ramu and the Sepik.<sup>5</sup>

<sup>1</sup> Bamler, V. G., "Tami," in Neuhauss, *Deutsch-Neu-Guinea*, Vol. iii, p. 489.

<sup>2</sup> Stolz, "Die Umgebung von Kap König Wilhelm," in Neuhauss, Vol. iii, p. 245.

<sup>3</sup> Hagen, B., *Unter den Papua's in Deutsch N.-G.*, Wiesbaden, 1899; Semeyer, W., "Beschr. Cat. L. Biro," *Eth. Sam. Ung. Nat. Mus.*, Vol. iii, Budapest, 1901.

<sup>4</sup> Vormann, F., *Anthropos*, Vol. v, 1910, p. 407; Vol. vi, 1911, p. 411.

<sup>5</sup> *Mitt. der anth. Gesell. in Wien*, Vol. xxv, 1895, p. 235; *Z. f. Eth.*, Vol. xxxix, 1907, p. 382; *Geogr. Journ.*, Vol. xxx, 1907, p. 609.



The wonderful men's houses of the Middle Sepik, and the numerous and elaborate paraphernalia connected therewith point to a high development of ritual, but of this no details are available.

Thanks to Thurnwald (p. 274) we have, however, some precise information concerning the Banaro of the Middle Keram, the most easterly southern tributary of the Sepik (Map IV). The neighbouring tribes are said to have similar ceremonies; they all belong to a different culture from that of the Sepik tribes. The marriage ceremonies are not differentiated from those associated with puberty. Girls are secluded for nine months in a cell in the family house and subjected to tabus. At the end of this period they are driven into the river and pelted with coconuts. That evening the father of the bridegroom-elect takes them into the ceremonial house *buek* ("goblin hall"), hands them over to his friend of the opposite side of the *buek*, who, in the rôle of a goblin, initiates them into sexual life in front of the hidden flutes. Not until a child is born can the bridegroom touch his bride. The young people finally begin married life in a new house erected by the bridegroom; the "goblin child" is counted as their own. The sacred flutes play an important part in many ceremonies, the sounds they emit are supposed to be the voice of the goblin himself, and the sight of them is tabued to women.

The initiation of the boys begins with eating wild pigs and ends with eating domesticated pigs. The boys are first taken to another house, then carried by the fathers' and mothers' brothers to the *buek*, the flutes are blown and pressed on the navels of the boys. After further ceremonies the boys are placed on pieces of sago bark, and the fathers' and mothers' brothers blow the flutes and instruct the boys in their use. They are then confined in cells in the *buek* for some eight months. Numerous ceremonies take place—one in connection with the bullroarer. After three months the phenomena of the world that surrounds them are presented as spirits in the shape of wooden figures; they are also introduced to ancestral and other spirits. At the concluding feast they are specially decorated and given a small carved wooden figure as a love-charm. Taking this, each goes into the bush, followed by an elder woman, ordinarily the wife of the mother's goblin initiator. This is the boy's initiation into sexual life. The boys with the flutes are bathed ceremonially. Next day the adult men push the adult women into the river with a sham fight, and *vice versa*. That evening the rite in the *buek* is repeated in a more extensive manner. The boys may now resume ordinary life.

In these ceremonies the sexual element predominates; the "goblin," so far as our evidence goes, appears to be mainly concerned with the initiation of the girls, but when the ceremonies for the initiation of the boys are fully described we may expect to find that the "goblin" also affects them. The social distinction of the two sides of the *buek* finds a parallel in the *dubu* of the south-eastern peninsula, and I have very imperfect unpublished notes which point to a more exact one to the *ravi* of the Namau, and probably also to other ceremonial houses of the south coast. There does not seem to be a very close connection between these rites and the *balum* cult. It may



be noted, however, that there is easy land communication between Huon Gulf and Astrolabe Bay by means of the valleys of the Markham and Ramu, and also that the Ramu and the Upper Keram are very close together, at about 5° S. lat.

At first sight we might be tempted to regard all these ceremonies as part of the culture introduced into New Guinea by Melanesian-speaking peoples, but, so far as the south-eastern peninsula is concerned, the Melanesian immigrants appear to have had an inhibiting influence, though Neuhauss states that the relatively late migration of Melanesian-speaking people of the north coast has approximately the same circumcision custom as the Papuan aborigines, and that the *balum* cult is entirely lacking among the Melanesian Lae-Womba up the Markham River, at the head of Huon Gulf.<sup>1</sup> On the other hand, we may confidently ascribe the sacred flutes to direct Melanesian influence, but the cultural drift that brought these into New Guinea was entirely different from either of the two main migrations into the south-eastern peninsula.

When the coastal people have these ceremonies we constantly find that there are certain intimate relations with the mountain people, which would hardly be the case if the ceremonies had been introduced by the former. The conviction is thus borne in on one that the ceremonies belong essentially to the mountain folk,<sup>2</sup> but the mountain people are universally regarded as aborigines, and ethnologists term them Papuan.

We are now beginning to recognize that there is a large diffused "Pygmy" (Negrito) element in the interior of New Guinea. The customs of the "Pygmy" folk have not been recorded, but it is very improbable that they have elaborate ceremonies. Thus it is to the true Papuan that we must look as being the main source of these customs. Whether most of this ceremonial complex was elaborated by the Papuan or whether, as is most probable, he received it as a whole or in part from others, and possibly at various times, is another problem.

There are many other ethnographical problems in New Guinea connected with the distribution of certain objects and the spread of recent and ancient customs and cultures which are well worthy of study, but in most cases further investigation in the field is necessary before definite conclusions can be arrived at. The elucidation of these distributions and cultural drifts within New Guinea itself, interesting though they may be, are, however, relatively of minor importance compared with their relation to the movements that have taken place in Indonesia and Oceania, and ultimately we have to look still further afield.

<sup>1</sup> Neuhauss, *Deutsch-Neu-Guinea*, 1911, Vol. i, p. 158.

<sup>2</sup> Corroboration of the observations made in British New Guinea comes from Netherlands New Guinea. The inland tribes of the Mamberamo (137° 50' E. long.) are of a different stock from those lower down, and apparently speak a Papuan language. A flood myth is current among them. On the day before the great initiation festival women and children leave the village. The novices are taken into the men's house and are said to be blind and see nothing. Just before sunrise the sacred bamboo flute is sounded (no woman may see or hear it, or the Mamberamo would again overflow the land and kill all living beings). The novices' eyes are opened when they hear the flute, and they now recognize the sanctity of the men's house. Only pig and cassowary are eaten at the great feast which ensues. A similar festival is held by all the tribes up to the central mountains (Moszkowski, M., *Z. f. Eth.*, Vol. xlii, 1911, pp. 340, 342).



## APPENDIX.

For the convenience of students I append more detailed summaries of the ceremonies alluded to in the spoken lecture.

The Kaia-kaia or Tugeri, at Merauke (about 140° 23' E., 8° 28' S.), are head-hunters and cannibals. All the men sleep in a few men's houses at each end of a village, and there is a bachelors' club house outside the village; no one may enter the house of the opposite sex. There is a complicated patrilineal exogamous totemic system in which plants are combined with animals into main and subsidiary groups. The bullroarer has the same name (*sosom*) as that of a mythical monster in the bush, who at the annual festival at the beginning of the south-east monsoon devours the novices but brings them back to life. Bullroarers, which the women may not see under penalty of death, are swung at these initiation ceremonies, and the youths receive a new name, but are not circumcised. From time to time great feasts are held, in which several villages join; at these dances masks are worn which represent various animals, and kava, *vati*, is drunk (Seligman, C. G., *Man*, 1906, No. 42. Pösch, R., *Sitz. K. Akad. Wiss. Wien*, Vol. cxv, 1906, p. 899; *Z. f. Eth.*, 1907, p. 392; *Geog. Journ.*, Vol. xxx, 1907, p. 616. Nollen, H., *Anthropos*, Vol. iv, 1909, p. 553).

Our knowledge of the Western Papuan "bushmen" is very slight. Most of the groups are poverty-stricken and broken-down people, and for the present they must be left out of account (*cf.* Beaver, W. N., *Unexplored New Guinea*, 1920).

Among the patrilineal Masingle (Masingara), an inland tribe behind Mawata, there seems to be a reminiscence of a monster who eats children. They tell of a crocodile called Nugu, who sang and talked to two young ones in the Masingle language. The people asked him to be their god and they would provide him with food. He refused, but they caught him, and one of the young crocodiles named Ulbe. Nugu began to eat the Masingle children, but refrained from doing so when the people promised to supply him with pigs. In a small house, *maia*, in which unmarried men live, there are well-carved effigies of these two crocodiles which are used at the large hunting dances, being placed in the middle of the circle of dancers and refreshed with libations of kava, *sie*, and greased with pig's fat. There is also an effigy of Nugu in human form which is kept in the chief's house, and is the great "totem" of the tribe. Crocodiles, *sible*, may be killed, but not eaten, by the Masingle. The first woman introduced the ceremony which is connected with the kangaroo, and forms part of the initiation of the young men (Hely, B. A., *Ann. Rep. Brit. New Guinea*, 1894-5, p. 45; *ibid.*, 1893-4, p. 54).

The Gogodara (Kabiri or Girara) exhibit two physical types, one with broad cheek bones, and a typical platyrrhine "Papuan" nose; the other has a narrow face, thin lips, and narrow nose.



\* Five times during the rainy season a ceremony, *moi iata*, is held. Before each ceremony a small boy suddenly disappears from the village. It is given out that he has been taken by a crocodile who was angry with him for approaching the *kakanipa*.<sup>1</sup> This is a house which only married men may enter; anyone else attempting to do so would be eaten by a crocodile. In it are kept three large carved wooden crocodiles, Posia, Gatehidi, and Moi-ira, together with other ceremonial objects. There is much wailing, and the bereaved parents approach the *samu* or chief sorcerer and ask him to implore the crocodile to restore the boy. He orders the unmarried men and women and children away to collect food. In their absence the crocodiles are removed to the communal dwelling, *genena*, and to the head of each is affixed a huge cane effigy of a crocodile's head. The boy, who had been blindfolded and hidden in the bush, is placed within the cane mouth of Posia, and a fence is erected round it and the boy. When all is ready, the *samu* and his assistants don masks and beat drums till the villagers return. Payment is made for the recovery of the boy. Then follows dancing and feasting in honour of the mighty crocodile, and marriages are celebrated. There can be little doubt that this is primarily an initiation ceremony.

The material culture and decorative art of these people differ in many respects from any of the coastal peoples of southern New Guinea (Beaver, W. N., *Unexplored New Guinea*, 1920, p. 188; *Ann. Rep. Papua*, 1911-12, p. 11. Lyons, A. P., *ibid.*, 1913-14, p. 100. Haddon, A. C., *Journ. Roy. Anthropol. Inst.*, Vol. xvi, 1916, p. 334; *Man*, 1917, No. 132).

Mr. L. A. Flint (*Man*, 1919, No. 19) has described a *muguru* ceremony at Torobina, Damera Island, in the Bamu estuary, which he witnessed in a new men's house. A number of men blew shell trumpets, and then nude women bearing torches entered the "*dubu*." The fires were covered up, and all indulged in sexual intercourse, which was witnessed by the young children. The shell trumpets were sounded and the fires brightened up. This was repeated every two hours till daybreak; at intervals an indecent comic performance of two men took place, and the children were instructed in sexual and matrimonial matters. At daylight a screen was erected across the centre of the house, the elders being at one end and the children at the other, so that the children might discuss what they had seen. At daybreak payments were made for sons and daughters who were being married. At a *muguru*, which continues for a month and is always held upon the completion of a new men's house, wives are exchanged, and the younger women pass temporarily into the possession of the older men. On the last night a number of wooden figures—two men, Agisa and Morigiro, a woman, Sirura, a crocodile, shark, and black pigeon—are brought into the men's house and shown to the young people.

Under the name of Kerewa may be included the people of Goaribari Island and those of the neighbouring mainland and islands. The Kerewa language is allied

<sup>1</sup> This word is strangely like *kanibu*, which is the name given by Chalmers to the *kopiravi* of the Namau people.



to that of the Kiwai folk. The *agiba* are kept in the *dubu daima* or long houses of the married men. The employment of a skull shrine, termed *agiba*, may be taken as a criterion of this culture. Chinnery informs me that this custom extends also to the Kiko-Kairi tribes on Ututi creek (about seven miles above Kikori station), to the region of the mouths of the Omati and Turāma rivers and probably further inland. An *agiba* consists of a flat oval board, carved to represent a human face, the lower part is perforated so as to leave two vertical hooks; in front of an *agiba* is a shelf which supports human skulls, which are attached by long loops to the hooks. These are the skulls of enemies or strangers, who have been killed and eaten. There is reason to believe that an *agiba* is a family shrine, and the figure possibly represents an ancestor. It is obligatory to kill a man when a new *dubu daima* is built or a new war canoe made. The victim is eaten and his skull attached to an *agiba*. The skulls are decorated in various ways, incised patterns may be made on the skull itself, or an artificial face is made of clay and painted; shells or seeds may represent the eyes; skulls covered with seeds, with cylindrical projections from each orbit, are occasionally found, but these appear to be more common on the Bamu, where also occur miniature shrines, essentially similar to the *agiba*. To these *gope*, as they are called in the estuaries of the Bamu and Fly, are attached skulls of birds and other animals. I noticed similar bird-shrines, *maribu*, in certain Kerewa villages, and Mr. Chinnery has seen one in an Ututi village. The custom of inserting a fret-carved board into the nasal aperture of a skull extends from the Kerewa villages to the estuary of the Fly, where it is called *kanega*.

Carved boards, *kaiai muru*, or effigies representing human beings, are placed in the *dubu daima*, and are doubtless connected with an ancestor cult (Haddon, A. C., *Man*, Vol. xviii, 1918, No. 99, and see Beaver, W. N., *Unexplored New Guinea*, 1920, p. 243).

The only account of a ceremony on Goaribari Island is that given by H. J. Ryan (*Ann. Rep. Papua*, 1913, p. 76). After a quantity of food has been obtained, drums are beaten violently and a procession starts from the *dubu daima* to the *ohia-bai-daima*, or single men's house, where the bachelors are sitting. A married man gives a cassowary bone to the appointed lad (or lads), who follows the man to the *dubu daima* between two lines of married men and women; the latter return to the *moto* or women's houses. The boy is placed within a screened-off cubicle, where he fasts and is guarded for two days and nights; the third day he eats banana and sugar cane, and that night there is dancing in all the houses. The fourth day all go to get food except the secluded boy and his guardians. That night there is a feast in the *dubu daima*, in which the boy does not join. When this is over the boy is taken to the *moto* by his two guardians, where his future wife is sitting between the guardians' wives. They all return to the *dubu daima*, and the boy is addressed by a married man in the hearing of the girl on sexual hospitality. Then the girl and her guardians return to the *moto*. Invitations to a feast and dance are sent to neighbouring villages. During the dance the boy sits on a raised platform on one side of the *dubu daima*.



with his guardian, and opposite him the girl with hers and her brother. When the dancing is over the women take the bride back to the *moto*, where they prepare food, and at daylight carry it to the *dubu daima*, and the boy and his bride eat together. They then take a walk by themselves, and the first man they meet has intercourse with the bride and gives her husband a present. Mr. H. C. Cardew informed me in 1914 that the bride is brought from her house to the back entrance of the *dubu daima* standing on a piece of bark supported on an oblong piece of heavy wood, which is carried by means of transverse sticks by her relatives. After a dance in the *dubu daima* she is similarly conveyed to the bridegroom's father's house. The lower board is left there, but the bark board is put by the bride's brother in the rear gable of the *dubu daima*, and all the small boys shoot arrows into it.

The *kopiravi*, or *kai-ia-imunu* ("sky *imunu*") of the Namau are large basket-work monsters which are kept in the gloomy far end of the great ceremonial houses, *ravi*, of the men. Each *kopiravi* has its name, and is in the particular care of a special man; they are never taken out of the *ravi*, and no native woman is ever allowed to see them. Valuable offerings are said to be made to them; the sick apply to them for healing, their friends presenting gifts. Before going out to fight the men consult the invisible spirit of the *kopiravi*. It comes out of the *ravi* and causes the canoe to rock if the expedition is to be successful. The dead bodies of enemies are thrust inside the *kopiravi* and left there all night while the men dance in the front part of the *ravi*; next morning the bodies are said to be cut up with bullroarers, cooked and eaten. A human victim, a cassowary and a pig, have to be sacrificed when a war canoe is completed, and probably human beings are sacrificed when a *ravi* is built.<sup>1</sup>

According to Holmes, the conception of *imunu*, "the life principle," runs through all the region of the Namau. Their religion appears to be a combination of totemism, head-hunting, cannibalism and a manes- or ancestor-cult, associated with which are ceremonial tablets, masks and bullroarers. The *kopiravi* may prove to be the effigies of spirits (possibly ancestral), who may be regarded as gods. The ceremonial tablets, *koe*, seem to be personal *imunu*, and the faces carved and painted on them are probably representations of dead relatives. Masks are *imunu*; bullroarers, *imunu viki*, "crying *imunu*," may represent ancestral ghosts. Down each side of a *ravi* are numerous shrines, each consisting of a screen of *koe*, in front of which is a heap of animal skulls, and, where the government is not in control, of human skulls also (Haddon, *Man*, 1919, No. 91).

Holmes (MS.) states that the Maipuns came from Urama, and migrated to Kaiuari in the village now called Kaueravi; eventually they ousted the Moreaiipi.

Elema is a convenient name for the coastal district between the Alele mouth of the Purari and Cape Possession, and this general term may be used for the two

<sup>1</sup> Chalmers, J., *Pioneering in New Guinea*, 1882, pp. 62-6; Murray, J. H. P., *Papua or British New Guinea*, 1912, pp. 176-184.



groups of tribes found in that area. In one group the tribal names end in *ipi*, in the other they end in *u*, *au* or *ra*.

Tradition relates that they came from the upper waters of the Purari and southern slopes of the Albert Victor range. Ivu, the reputed ancestor of the *ipi*-group, sprang from the ground beneath a Hoa tree (or a wild ginger plant). He dragged his wife, Ukaipu (the spirit of the snake), from another tree, and they lived under the Hoa tree. To their eldest son, Haiapu (the god of the belly), was assigned the task of appointing guardian deities for all the customs of posterity, whose effigies he made, and named, almost every phase of social life having its respective deity. The special work of the second son, Lelevea ("chief of men," or, in one version "the consecrated feast"), was to grow food for the gods, build houses and do other domestic work. The brothers quarrelled, and Haiapu went to Urama, where he married a local woman and settled down, but intercourse was maintained with the original home. Ivu procured a wife for Lelevea from a tree, and he laid down the existing code of conduct. The original tribe grew in numbers, but quarrels ensued and sections split off at various times which went southward, but were deflected to the east by the fierce Parivau tribe, who appear to have occupied the region between the Purari and the Vailala. Eventually they reached the coast at various spots.

The first swarm, the Uaripi, came over or along the Albert Range, and down the Opau Valley to Kerema Bay. The Milaripi followed, probably along the northern slopes of the Albert Range, and settled on the coast east of Cupola Hill at Milaripi (Wamai). The Kaipi arrived about the same time as the Milaripi, and occupied Freshwater Bay. The Toaripi (Motumotu) went further east, came down the Tauri River, and settled at Eavara (Moviavi), seven miles inland from their present village at the mouth of the Lakekamu (Williams River). The almost extinct true Moaripi are said to be an offset from the Milaripi. They live on the coast south of the Lakekamu, at Moaripi (Lese), Miaru (Biaru), and Fave (Jokea). The Moreaipi were the last to leave. They burst through the then-enfeebled Parivau, crossed the Purari delta and settled on the west bank of the Alele at Apiopi. Later the Maipua tribe drove them to Orokolo Bay. They are also known as Hereva. Owing to troubles, some of them went to Vailala.

We now turn to the other group. The Lepu live at Oikapu (Oiabu), about ten miles west of Cape Possession, and at Sipoi, but originally they were at Misa, about three days journey due north. The Muru live about eight miles inland from Orokolo.

The Parivau occupy the range of hills between the Purari and the Vailala. The Opau, or Opao, of the valley behind Kerema Bay are a split from the Muru.

The Eavara (of "Moviavi") appear to be an offshoot from the Toaripi. The Haura and Keuru have only recently come to the coast between the Vailala and Cupola Hill at the eastern boundary of Kerema Bay. Holmes has found representatives



of this tribe on the upper waters of the Vailala in the neighbourhood of the former German boundary, and has noted in them a marked tendency to migrate coastward. The Haura are the descendants of a woman who is said to have married a crocodile; they are of a different stock from the aboriginal population of the Elema hinterland.

It is hazardous to generalize from insufficient data, but it seems as if provisionally we may regard the *ipi*-tribes as being a relatively late coastward movement from the mountains in which the Purari rises. Holmes considers that the Moreaipi settled on the coast about A.D. 1800, or perhaps somewhat earlier, while the Toaripi did not reach the sea till about 1850. With this migration may be associated without doubt the ceremony of investing novices with the Kovave mask, and probably other ceremonies in which masks are employed.

The country between the mountains and the sea was apparently inhabited by various tribes such as the Maipua of the Purari delta, the Parivau, Muru and Opau; perhaps belonging to this group are the Lepu, who, unlike the last three tribes, reached the coast. There is no doubt that the present culture of the Maipua and allied tribes of the Purari delta is closely related to that of the *ipi*-tribes. Indeed, Holmes regards it as the more primitive form, as is borne out by the story of Haiapu. Extremely little has been published about the culture of the inland tribes of this group, but it appears to be quite distinct from that of the *ipi*-group.

The ceremonial houses of the initiated men (*ravi*, *Namau*, *eravo*, Elema) are gigantic and elaborate structures, which form the centre of the social and religious life of the men. Although there is great similarity between the *ravi* and the *eravo* in structure, contents, and the socio-religious activities connected therewith, there are certain important differences. The *ravi* has a "holy of holies" screened off at its blind end, which contains the mysterious sacred *kopiravi*, whereas the *eravo* has a through gangway, and has a back door, and there are no *kopiravi* or analogous objects. The *ravi* contain numerous skulls of human victims who have been killed and eaten, but whereas the *eravo* at Orokolo formerly contained human skulls, those at Toaripi did not, as they had not the habit of beheading their enemies; furthermore, the Elema were not cannibals.

The totemic system of the Elema tribes, as described by Holmes, is somewhat difficult to understand, as it has been obscured by an ancestor cult. The name for ancestors, *ualare*, is that by which all sacred objects are designated. Certain animals are *ualare*, and as these were never injured or eaten by the ancestors, so their descendants hold them sacred; or they may be natural objects or phenomena.

(1) All tribal *ualare* are regarded as deities who in the long ago temporarily assumed human form when they became the ancestors of the respective tribes, and at the same time appropriated certain areas for their posterity, which they furnished with vegetable food. Some of the immediate descendants of the several original ancestors are credited with his supernatural attributes.

(2) Clan *ualare*-deities are ancestors who acquired their powers from the father



or from the mother (in the latter case descent is matrilineal), who created himself from a natural object or is a nature deity.

(3) Individual *ualare*, unlike the others, are not inherited. A personal *ualare* may be that of either parent or of the person, living or dead, after whom the person is named, or as the result of a dream. Every man of legitimate birth has two *ualare*, such as a dog, a pig, a wallaby, a bird, a fish or a tree; rarely a man may have two trees, or only one *ualare*, as women have. A man should not injure or eat his *ualare*; he fasts and mourns as for a relative when one is killed, and he wears parts of it as personal adornment—which others may not do.

The following abbreviated account of initiation among the Elema tribes is taken from Holmes, but doubtless there are many local variations.

The initiation of a youth is all-important, since it is on the performance of the instruction which he has received as an initiate that the social and moral welfare of the tribe depends. The various stages are marked by feasts at which pigs are given to the officiators.

The first stage is when the boy is about eight years of age. He is formally taken into the *eravo*, and greeted with the noise of bullroarers, *tiparu*, which he sees for the first time. One is placed on his chest, and he is severely beaten.

Two or three years later he enters the *eravo* for a period of strict seclusion, and the clan feast of Kovave is then held. Ten days previously a large number of young men wearing conical Kovave masks draped with a long grass fringe announce that Kovave is about to enter the village. These are the sacred messengers of the mountain god, as is proved by the fact that they do not walk on the soles of their feet. Drums are beaten and conches sounded as a warning to the uninitiated that gods are present in the village. Every night bullroarers are swung, and all women and children are kept indoors. On the great day large quantities of food and pigs are taken to a tabued spot in the bush to appease Kovave's hunger. At nightfall the novices are marched there and beaten as they go along. Out of the gloom a feigned gruff voice assures them that Kovave is speaking to them. He promises to be their friend as long as they keep all tribal and clan duties, obligations and secrets; otherwise they will be punished with disease and death. Unexpectedly a Kovave mask is placed on each boy's head, amid loud buzzing of bullroarers; he is then beaten and all are marched back to the *eravo*. The feast is partaken of by the initiated members of a given clan, not by the tribe. The head of the initiate is shaved and his sporran replaced with a perineal band. The lads remain for three years in well-guarded seclusion in the *eravo*, subject to numerous food and other tabus, and social and moral instructions are imparted.

The lads during their period of seclusion are termed *heava*; in the succeeding stage they are known as *heapu*, during which the absolute seclusion terminates. The lads may now go out into the sunlight and attend feasts, but under strict surveillance. They always appear in public adorned with headdresses, shell



ornaments, and carry either clubs or bows and arrows; they also wear plain ruddled bark belts, which they tie very tightly round their waists; the carved bark belts are not worn till the final stage has been attained. They have to pass through certain unpleasant tests before they are admitted as *semese*.

On becoming *semese* the initiate is inducted into the mystery of the bullroarer, *tiparu*, which is used as a visible expression of a malignant deity said to reside on Yule Island. The *tiparu* feast is held in a secluded spot in the bush, but the only thing to be seen is a display of clever manipulation of the bullroarer, concerning which he is bound to absolute secrecy.

The final stage is the *emehe* (Orokolo) or *semese* (Toaripi)—the warrior festival, which is of tribal significance, and in which large masks are employed. First of all numerous pigs are killed, accompanied by much noise. Four men wearing Kovave masks arrive from a hill village, and receive presents of pigs. In the evening there is a procession from the *eravo* of men wearing large symbolic fringed masks and effigies, who are followed by most of the villagers. The novices and recent initiates man a scaffolding in front of the *eravo*, and welcome the effigies with song. Armed men in front of the effigies shoot arrows at the *eravo*, and dancing is kept up all night long. At daybreak there is another procession of human-faced masks and totem effigies. The festivities last as long as the food holds out; only the initiated may eat pig-flesh, others must eat dog-flesh. At the last procession there is no dancing, and all the masks are burned. The festival has a far more profound religious significance to the native mind than it can express to an alien mind. At it friend and foe meet in peace on common ground, all anxious to do honour to their ancestors, from whom come all temporal blessings. The period of probation is now terminated, and the initiate may marry and take his place in the social life of the community.

The concluding ceremony of initiation is the *makaikara*, or sea ceremony, which may be clan or tribal; totemic decoration is employed, but no masks. The chief addresses the people, and then shouts to Kaiapo, the god of the sea, acknowledging the indebtedness of the tribe to him, and invokes him to continue his protection of their crops and give them a plentiful supply of fish, and reminds him that the present festival is in his honour. The clan *makaikara*, though impressive, is less elaborate.

The broad features of initiation appear to be:—

- (1) A complete rupture from the old asexual life of childhood;
- (2) A clan rite of integration with the mountain-god;
- (3) An intermediate stage;
- (4) The explanation of the bullroarer;
- (5) The tribal warrior festival; and
- (6) A clan or tribal introduction to the god of the sea.

The bullroarer is swung at 1, 2 and 4, masks are worn at 2, 5 and 6, and, if I



understand Holmes correctly, totem emblems at 5 and 6. Not until he has passed through all the stages of initiation can a man marry and take his full place in the social life of the community (Holmes, *Journ. Roy. Anthropol. Inst.*, Vol. xxxii, 1902, pp. 418, 426; Vol. xxxiii, p. 125; *Man*, 1905, Nos. 2, 10, and MS.).

Formerly each clan of the Mailu had its club house, *dubu*, which resembled an ordinary dwelling-house of the southern Massim type, or of the local type. There is a small initiation ceremony when the eldest boy is given his perineal band by his maternal uncle, the younger brothers get theirs from the first-born. In former days the acquisition of an enemy's head was necessary for initiation in a *dubu*. For a fortnight the lad was confined to the *dubu*, and subjected to tabus. Part of his duty was to remove the skin and flesh from an enemy's head. At other times the adoption of the perineal band took place on a double canoe, and would then be held in connection with the pig feast, *maduna*. The ceremony is always accompanied by a small feast and gift of a pig. The central feature of this ceremony is the *govi maduna*. The other small feasts and dances may be passed over, but it may be noted that in one of them a pile of stones is erected in front of the house of the master of the feast. A fasting period, *udini*, begins about two months before the final ceremony. This is prefaced by the *oilobo* or mango ceremony, at which the future fasters blacken themselves, but all are profusely decorated. They bring from the bush mango saplings to the top of which two streamers of a creeper are attached, and to the noise of conch (Triton) trumpets, the master or masters of the feast follow the mangoes, each walking behind the bearer of his sapling. Then follow men who beat drums, sing and dance. On entering the village they are met by a group of women decorated with diadems of white cockatoo feathers and shell ornaments. Two large mats are spread in the centre of the village on which the men participating in the ceremony squat down. There is a ceremonial eating of betel-nut, accompanied by a betel-nut incantation, in which are mentioned two legendary men who lived at Maivaro in Milne Bay, and were the first to introduce betel-nut into the country; the song makes the nuts plentiful. Then follows the ceremonial cutting of the saplings into pieces about 30 cm. long. These with the creepers are wrapped in mats to form the charm which ensures an abundance of pigs, which is the essential element in this *udini* ceremony. The whole ceremony is extremely serious and important in the eyes of the natives. After this, there begins the fasting and general tabu on the part of those who are to participate in the subsequent dance and feast. For the final feast enormous quantities of food are collected, and fat pigs are imported from Aroma and elsewhere. Visitors arrive in great numbers, often from great distances. The feast is the climax and the object of the fast and of the magical practices of the *udini*. Besides the ceremonial dance, *govi*, there are others of a non-ceremonial character in which both sexes take part. Food is distributed, and the pigs are killed on platforms erected on the bush side of the village. In addition to the ceremonial decoration of the dancers and officials,



there is a general display of finery of all kinds. Another general feature was the fighting which seems to have been prevalent, though not resulting in much bloodshed. The *maduna* was held by several villages in rotation, but usually it was actually given by one or two clans. The great majority of the pigs were given in return for pigs previously given by members of the clan as payment for their wives (Malinowski, B., "The Natives of Mailu," *Trans. Roy. Soc. S. Austl.*, Vol. xxxix, 1915, p. 494).

The following account of the *walaga* feast and cult of the mango is abbreviated from the excellent descriptions given by C. G. Seligman and E. L. Giblin, and by H. Newton in *The Melanesians of British New Guinea*, and in *The Papuans*, by M. I. Stone-Wigg (Melbourne, 1912).

The headman of the clan giving the feast selects a young wild mango tree, and he and the men who help him to clear the ground round it are holy; they may not drink or touch water, nor eat boiled food or mangoes. These fasting men live in a special house, *potuma*. A number of women of the same clan, who will participate in the dance, undergo the same tabus as the fasting men. A platform is erected in the bush round which a temporary village is built, the platform, *walaga*, being prepared and erected by the fasting men with the aid of all the medicine-men from the neighbouring mountains, who bring their charms with them and extract from each supporting post the *aru* (ghost) of any dead man that may happen to be present in it. They carry the ghost away and release it in the bush. At Awaiama and Taupota, to the east of Bartle Bay, bullroarers, used at no other time, are said to be swung by the fasting men all the time that the posts are being stepped. When the *walaga* is finished, word is sent round to neighbouring villages that the feast will take place in five or six days. The day before the feast the fasting men clear a trail to the selected mango tree, which is carefully cut down by them with a special stone adze (iron should never be used), and all chips, etc., are caught on new mats. With great ceremony and care the tree is wrapped in mats with the chips and fallen leaves, carried to the *potuma* by the fasting men, and later tied to the central pole of the platform. No part of the tree may ever touch the ground. The pole is some 30 feet high, and vines decorated with coloured streamers, etc., are tied from its top to the gables of the houses. Round the edge of the platform are placed poles about 4 to 6 inches in diameter, on which the *walaga* is danced. Things belonging to a dead man may be hung on the pole above the tree. Guests arrive bringing pigs; if one brings five pigs, it is called a "mango," and a small mango tree is cut down. Dancing and singing continue all night. At daylight the pigs are killed, being speared as slowly as possible, so that the maximum amount of squealing takes place. The mango tree must hear their cries, smell the burning fat, and know that blood has been poured out. Otherwise the crops will fail, the fruit-trees will be barren, the pigs will not be productive, and even women will fail to bear children. After the distribution of food, the guests disperse. The following day the mango



sapling is taken down, wrapped up in mats, and hung in the roof of the *potuma*. After an interval of many months it is removed and carried with great ceremony to the centre of the temporary village. A certain man cuts green mangoes in pieces, and puts them in the mouths of the fasting men, who chew and spit the fragments in the direction of the setting sun, so that "the sun should carry the bits of the mangoes over the whole country and everyone should know." A piece of the tree is cut off and burned with the chips, etc. The mango tree is again wrapped up and carried to the permanent house of the headman of the clan that made the *walaga*. It is brought out and exhibited at intervals, and a piece broken off and burned on each occasion till it is totally destroyed. Then this community may have a new *walaga*, but another community may have a *walaga* in the meantime.

It seems that in some way the *walaga* is specially the *finale* for all death feasts, and the idea is that the spirits of the dead should be gratified by knowing that all duties have been performed. If not, they would take revenge. Yet the spirits of the dead do not seem to be present (Newton, Seligman, p. 651). Stone-Wigg relates that in ancient times before Dabadaba was born human victims were offered at the periodical great feast. He was the only man-child of his mother, the rest of her offspring being pigs; he persuaded the people to substitute pigs for men at the feast. After he died, his spirit can be passed by ceremonies and incantations into the mango tree selected for the *walaga* feast.

In what is known as the Northern Division of Papua, or that region which extends from the great divide to the coast, and from the Eia River to the Hydrographer's Range, Lieut. E. W. P. Chinnery distinguishes three main groups or peoples: (1) the Mountain People; (2) the Bush Orokaiva; and (3) the Coastal Orokaiva. There is much in common between the last two groups. (Map V.)

(1) The Mountain Peoples are shorter and of lighter skin colour than the Orokaiva. They are divided into several local groups, each of which may be composed of distinct communities, to each of which the term tribe may be applied. Very little has been published concerning the social life of any of these peoples, but I am able to give a few further details owing to the kindness of Chinnery in allowing me to make use of his MSS.

The Biagi community of the Mount Victoria group are a fine lot of men. When a lad has killed a man he is isolated for two months in a special house. Then a great feast, *maincai*, is held, at which the impressive ceremony (*kawu*) of decorating him with the insignia of a homicide takes place. A lad has very little chance of winning a girl before he has killed a man. The bullroarer, *bui-i*, occurs, as it also does among the Kambisa of the Upper Chirima Valley Group, but there are no details as to when it is employed.

The Borli, one of the peoples of the watershed of the Waria River, have an initiation house, *guhu-bora*, in the bush, in which candidates remain from eight to ten weeks. When arriving, and at intervals during the seclusion, the initiated men,



*bora keda*, terrorise them with yells and cries like those heard in war, and the bull-roarer, *bora*, is constantly swung. When this is being done, the candidates may not lie down, eat or drink. There are various tabus, but the seclusion is not absolute. The lads must not flinch at anything that is done to them, nor may they laugh, though the elders attempt to make them do so by means of antics and indecent remarks and actions. The object of these mimetic performances apparently is to test the self-control of the lads, and to teach them the various things which they must avoid in future. When the period of seclusion is completed a feast, *ohoa*, is given in the *guhu-bora*, pigs are killed and eaten by the elders, and the novitiates stand before them to receive instruction in the use of the *bora* and sacred flutes, and also in other matters. Before the lads are returned to the village the sticks and strings of the bullroarers are burned, but the *bora* are kept for future use. The uninitiated, women and others, believe the *bora* to be the voice of evil spirits in human form.

Initiation among the Mawai group, a little lower down the Waria, is very similar to the foregoing. Sacred flutes are used, the same respect is paid to the bullroarer, *bui*, and the elders, also called *bui*, instruct the lads and give them tests of endurance. At the terminal feast, the boys are washed, taken outside the house, where a number of dead pigs have been placed in a line, and each boy stands on the pig presented by his mother. At the same time he is decorated by his father's brother. The fathers meanwhile rush about, wave their spears, and boast of their deeds of valour. A father, if he so desires, may on this occasion present his own homicidal ornaments to his son. The father's brother rattles his lime stick against the lime gourd, and eventually allows the lad to do so. The killing spear is placed in his hands, and he descends from the pig duly invested and wearing the flowers which on subsequent occasions will identify him as the son of a man who has killed in war. After this the novice must remain seated in a house for about a month, during which time he wears all his ornaments. After a rite of steaming, he is ordered to swim in the river; his mother tells him to stand on a dead pig, a loin-cloth is tied on him, and the initiation is complete.

The Goi-efu (Kuefa) live by the upper Akaifa affluent of the Biaru on the northernmost slopes of Mount Yule, but the main group of the Goi-efu occupy the next valley to the north on the Poto Range and the hills leading down to the Kunimaipa (Lakekamu). The men live in one, or more, houses, as the case may be, while the women occupy a long, low-lying building divided into compartments, one for each woman. There are also ceremonial villages, the houses of which enclose a rectangle with a long house at each end for women. This is used for periodic feasts with dancing, and all tribal warfare is then stopped. Chinnery (*Ann. Rep. Papua*, 1916-17, p. 61) states that children are admitted to adult membership of the community by certain stages. The ceremonies are conducted with some elaboration, and tabus are enforced. The first stage for both sexes is nose-piercing. On reaching puberty the boy in the presence of the community stands on a dead pig his father



has provided, is given moral and social instruction, while a perineal band is tied on him. New weapons are given him, and he is obliged to celebrate his initiation by killing a man or wild pig immediately afterwards. Girls go through an analogous ceremony. Homicidal insignia are worn. Bones of deceased relatives are worn, and even their dried hands and legs. Fingers are amputated as a sign of mourning.

The numerous tribes occupying the territory between the Eia River and the Hydrographer's Range (practically between 8° and 9° S. lat.), and the great divide and the sea may collectively be termed the Orokaiva. They are further grouped as Coastal and Bush Orokaiva, between whom there is much in common.

(2) Chinnery and Beaver have given us an interesting account of the initiation ceremony of the Manua and neighbouring sections of the Koko tribe, which inhabits the region about the Yodda River. These people migrated from the head of the Nimuni affluent of the Kumusi. This ceremony extends in an easterly direction almost to the coast. Ordinary initiations to which invitations are widely issued are going on continually throughout the year, but apparently at considerable intervals for each village. Boys and girls are initiated at the same time, having been previously secluded in houses, *thrar*, built for them in the bush. During the preparations trees are pulled down by the hunters of wild pigs, and bullroarers, *wuvu*, are swung, and the children are told that this is the work of spirits [probably ghosts]. On the night of the ceremony all lights are put out and the men, wearing huge head-dresses of feathers and frames of pigs' teeth over their faces, and armed with stone-headed clubs, enter the village square and kneel in front of a large central scaffolding. The candidates are brought in from the bush with yells and shrieks, men seize the lads, run up and down the village with them, and throw them on the scaffolding, the women following with waving spears, and all uttering cries and yells. The boys try to climb up the scaffolding, but are repeatedly hauled down. Sometimes a man will rush at the boys swinging his club and shouting "I am the spirit." Among other tortures the boys are drenched with cold water. Towards the end of the night the girls are put through a similar performance, though they are treated much less roughly. Immediately after daybreak the boys and girls are completely covered with hoods of bark-cloth. The boys are told to turn their backs, and the men pull down trees with lianas, which is said to have been done by the spirits. After this bullroarers are brought out for the first time, and the lads are told that the spirits are present. The men shout "Do not kill my child," and utter the names of the spirits, who are apparently dead ancestors. The hoods are next drawn off, and the bullroarers are shown and explained to the initiates [presumably to the girls as well as to the boys], but uninitiated persons are assured that the noise of the bullroarer is made by spirits. The bullroarers are taken into the bush, and pigs and other food are brought into the village. After the feast, the guests disperse. The initiates return to the *thrar* in the bush, where they must remain in close confinement for a month. They fast for four days; then all their food is passed between



the legs of important men. Large smoky fires are kept burning under the floor to make them sweat profusely. They are not permitted to talk much, and then only in a low voice. One-holed flutes are blown by the boys and girls [?] in the *thrar*. They are used in pairs—one about 5 feet in length, *inaku*, and a short one, *isaku*. Elsewhere such flutes are intensely sacred, and may on no account be seen by women and children. Should a boy happen to drop taro through the floor he would be killed. The mother would know of the death only when the other lads returned home, and she would not be permitted to make any comment. Instruction is given on moral and social matters; the lads were told "Now you have seen the Spirit, and you are fully a man. To prove yourself you must kill a man." Formerly a man ready cut up was provided by the youth for the headman to eat, or, as happens now, a wild pig might be substituted. Food tabus persist till the initiates have hair on their faces and have cultivated a large garden. Sexual licence is permitted to initiated persons during the festival (Chinnery, E. W. P., and Beaver, W. N., *Journ. Roy. Anthropol. Inst.*, Vol. xlv, 1915, p. 69).

(3) The following account of initiation among the Binandele of the Mamba is from Chinnery's MS. Initiation, probably on similar lines, is general throughout the other Coastal Orokaiva.

An initiation house, *oro*, is erected in the bush, and as each part is cut into shape it is addressed in the name of a deceased relative, who is invited to attend the dance, *ia*. Invitations are sent to friends, when the gardens of these are ready and the pigs full-grown. Platforms are built in the village to store the food. The visitors make camps in secret places in the jungle, and prepare their plays, *iaveto*, in which carved representations of crocodiles, turtles, etc., are employed. The *iaveto* of the hosts are rehearsed in the *oro*. The guests are summoned by conch blasts to bring their dance paraphernalia to the village square. During the night before the ceremony the boys and girls to be initiated are taken to the square before daybreak, and shortly before dawn a number of men blackened with charcoal and bedecked with old feathers to represent supernatural beings, burst through the walls of the *oro* and perform their play in the village square. At intervals the guests dash unexpectedly into the village and perform their plays. After seeing these, each boy or girl stands on a pig contributed and killed by the parents, and undergoes a course of instruction. The boys are invested with the perineal band, and with a small ceremonial drum and various ornaments. Next day the young people wear the coveted ornaments of their new social status and are put in a small open house, *wawa*, where they live for some months. During this period they have to observe several rules, and all food must be eaten hot. At the expiration of this period a feast is prepared, and the young people are steamed. The *iaveto* paraphernalia remain stored in the *oro* until young pigs are full-grown; a feast is then held, they are greased with the fat of the pigs, feathers are affixed to them, and they are thrown into the river. The master of the *oro* addresses the *iaveto* paraphernalia as deceased relatives, and entreats them to change into crocodiles and devour their enemies.



There is no totemism among the Mambule (Mafulu), but there are clans and clan villages, which are grouped into communities. There is no system of seclusion at puberty, no elaborate initiation ceremony, nor wearing of masks, nor use of bull-roarers. There is a ceremony at the investiture of boys and girls with the perineal band, at which the highly decorated child stands on a dead pig bought by the family from an outsider. Only peoples from other communities take part in the dance. This ceremony is frequently performed at the "big feast." At a subsequent date there is a purification ceremony in which wild pigs are eaten by villagers. A ceremony similar to that of tying on the perineal band must take place before boys or girls may enter the *emone* or club-house. A man picks up the child off the pig, runs to an *emone*, and hands it to the end man of a double row who are sitting upon the platform. The child is passed rapidly from hand to hand down each row, and returned to the carrier, who runs to the other *emone*, where the same takes place. After this a girl may enter an *emone*, but may not sleep there, but this free access to the *emone* ceases when she is invested with the perineal band. This ceremony also may take place at the "big feast."

The "big feast" is held in a particular village at intervals of about fifteen or twenty years and requires a very long preparation and an enormous number of village (not wild) pigs. A new *emone* is built, and also new houses, view platforms, and sheds for guests. Composite high posts are erected on which food and skulls are placed, and round the central space slender poles connected by a cord are put up and food is displayed on these. If one does not already exist, they build a box-shaped wooden burial platform on high poles containing the skull and bones of a chief, and others are added to it. Three trees are erected in the centre of the village. The ceremony that ensues is very impressive. Two women guests with pigs' tusks in their mouths rush round the enclosure brandishing spears, and strike out at the chief's *emone*. Male guests brandish spears also in silence, and knock down the trees. Other guests perambulate the enclosure. The chief of the clan cuts down the burial platform, which is not rebuilt. Food is distributed to the most important men, and the real dance is performed only by some of the guest men, who wear skulls and bones, in addition to feather headdresses, and carry drums and weapons. Various smaller ceremonies then take place, and there is a general distribution of food. The village pigs are killed on the spot where the burial platform stood, and placed in a line. Bones are dipped in the bleeding mouths of the pigs and the skulls and other bones anointed with them and then hung up. When the feast is over all the bones are removed from the posts, and are never used again ceremonially. Some may be hung up in the *emone*, or put in a box in a tree, or otherwise disposed of. After the guests have gone what Williamson describes as a purification ceremony takes place, wild pigs are killed on the site of the burial platform and eaten by the villagers. The bulk of the villagers then leave the village for about six months to make new gardens (Williamson, R. W., *The Mafulu*, 1912).



The ceremonies of the Kuni, who are a Melanesian-speaking people living between the Mafulu and the Roro, south of the Middle Angabunga, appear to be in the main similar to those of the Mafulu. They also have a great feast in honour of the dead. (Williamson, *ibid.*)

Along the northern shore of Huon Gulf from Samoa Harbour (7° S. lat.) to nearly its eastern limit, live the Bakaua, or Bugawa; adjacent to them and extending along the coast beyond Finsch Harbour are the closely-allied Jabim. Both of these Melanesian-speaking peoples practise the *balum* cult.<sup>1</sup> Among the Bakaua the term *balum* has a three-fold meaning:—

- (1) A secret cult of an uncanny being, to whom certain misfortunes are attributed, who, personified, is regarded as the ancestor of a village king called after him. Women are told that he is a greedy monster, desiring young peoples' lives, and must be bought off with well-fed pigs.
- (2) The bullroarer, which produces the voice of the spirit.
- (3) The soul of those who have been dead for a long time.

The spiritual principle or soul, *katu*, of a person becomes a spiritual being, *ngalau*, at death, and after a time these become *balum*, in which state they mostly have hostile relations with the living.

Youths are initiated into the mysteries of the *balum* or circumcision feast at intervals of ten to eighteen years; held in turn in the country of the Jabim and of the Bakaua, and between whites among the Kai, the mountain folk, or the Tami Islanders. The special house (*lum*) of the candidates, who vary in age from 4 to 20, is erected in the village, dogs' and pigs' blood and chips of various woods being placed in the holes for the posts. Boys in the *lum* have to abstain from certain food and fresh water for three to five months, and spend their time in making mats and flutes. On the day of circumcision, with great noise and swinging of bullroarers, the boys are conducted away from the village to the *balum* hut. This is a long, gradually decreasing hut, the roof-pole of which is a complete areca palm, the roots representing the head and hair of a monster and the crown of leaves its tail. The jaws are closed with mats on which terrorising faces are painted. Each boy is struck on the brow and under the chin with a bullroarer, to make him keep silence before the uninitiated, talk sense, show hospitality, act properly, and otherwise behave himself. As the boys are dragged into the hut, men squatting on each side emit growls, and in this way the boy novices, *saku*, are swallowed by a roaring monster. Circumcision is then made with obsidian flakes, accompanied by the booming of bullroarers and the noise of bamboo flutes. The *saku* remain in the hut in total seclusion from women for two or three months. They amuse themselves by swinging

<sup>1</sup> Zahn, H., "Die Jabim," in Neuhauss, *Deutsch-Neu-Guinea*, Vol. iii, p. 289; Lehner, S., "Bukaua," *ibid.*, p. 397.



bullroarers and playing flutes, and are instructed in tribal and personal conduct by the old men. Finally, the *saku* boys are brought back to a village in state, and all participate in a great meal, and henceforth they rank as men.

Schellong gives a long description of the ceremonies he saw at Kategga, near Finsch Harbour, in 1887. The festivities began on July 18, 1886, with the erection of a large "*birlum*" house on piles. It had massive flooring and four wonderfully carved and painted posts representing human faces. In January, 1887, there was a special dance, *ssabi*, for males only. On March 24, after a preliminary ceremony in the *balum*, 80 to 100 armed boys were taken into the bush between a double row of men holding bullroarers attached to long-feathered sticks, under which the boys passed. Bullroarers were swung in an open space in the bush, and the boys were crowded into a long low shed with closed gables; in front of the chief gable was a carved and painted wooden figure. After circumcision, the boys, *ssagu*, returned to the village, from which women were banned while the wounds were healing. The *ssagu* played flutes in the *balum*. When the women returned (about April 15) the *ssagu* went into the bush for about three months, where they lived in three great huts, played flutes and did plaiting and carving. During this time they might not see the women, who sounded small bamboo slit-gongs to warn the boys of their presence.<sup>1</sup> There was a ceremonial return to the village, each highly decorated *ssagu* was touched on the cheek and brow with a bullroarer by an old man. A great welcome from the women awaited them in the village, but the *ssagu* made no sign till a man struck on the ground with a palm-leaf stalk, and told them to open their eyes. The next day the *ssagu* bathed, were painted red, and thenceforth might associate with women. On April 3 there was a feast of armed men in the sacred spot in a bush at which the bullroarers were collected and wrapped up. Schellong heard of a girls' initiation ceremony, who after being shut up in the houses were brought out with ceremonial and then danced in a nude condition in public (Schellong, O., *Internat. Arch. f. Ethnogr.*, Vol. ii, 1889, p. 145).

Very prominent in these ceremonies are the sacred bullroarers and flutes, neither of which must be seen by the women, and the Cassis shell trumpet, *tau*, is also employed.

There are several kinds of bullroarers, *balum*, among the Bakaua (Lehner, *loc. cit.*, pp. 410-414). Each village clan has one ruling bullroarer, *abumtau*. These bear the names of prominent dead men, and are regarded as having their characteristic voice and build of body. These are handed down for generations, and their names are used as a war cry in pig-catching and for the girls' ceremony. Less respected, but also guarded from women, are the serving bullroarers, *ngasengomi*,

<sup>1</sup> Neuhauss says that they rattle a stone in a bamboo tube, and that the women of Tami Island, while in a sitting position, beat with a stick two dry pieces of wood of unequal length which rest upon the thighs. This is the only record of an incipient xylophone in New Guinea (Vol. i, pp. 155, 386).



which are also named after dead men, but they concern only the descendants of these. There are also bullroarers, *auwi langua*, of higher tone, which are the voices of the wives of the *abumtau*. Small bullroarers, *saling*, are worn by prominent men at the *balum* feast. Lehner gives an interesting account of the symbolism of the decoration of bullroarers. He adds that the idea of the reproductive force of nature underlies the *balum* cult. It is also clear that the bullroarers represent ancestors.

Schellong describes two kinds of flutes, the "female" *angagoeng*, with a single lateral hole, which is married to a "male" flute, *ding*, which is a simple cylinder of bamboo, like an organ pipe with a piston inside, which is moved rapidly up and down to produce different notes. Lehner speaks of three kinds: *auwi langua* (old woman), *alung dino* and *alungdino latu* (a female spiritual being and her child), which make deep and shrill noises; while Neuhauss<sup>1</sup> says that three kinds of flutes are employed at the circumcision feasts of the Jabim and Bakaua: (1) "Stemple" flutes (*auwi kakueng*, "the mature woman"), which make a horrible noise, the to-and-fro movement producing different tones; (2) transverse flutes (*ding*, "long spirit"), with but a single note (these flutes of different size are played in pairs); (3) *gelao*, about 15-20 cm. long. These must be distinguished from the many-holed reed flutes which occur at various spots along the coast, e.g., Jabim, and in some places have recently been introduced by labourers from the Bismarck Archipelago, though it is highly probable that they were previously transmitted from New Britain through the intermediary of the Siassi Islanders (Vol. i, p. 383).

These two sacred noise-producing implements have a different significance—the use of the bullroarer in initiation ceremonies is so widely spread that it must be regarded as belonging to an older culture stratum than the flute. Neuhauss tells us that whereas the bullroarer plays a chief part in the circumcision ceremony of the district about Huon Gulf, on the western part of the north coast, it is well known but employed mainly as a love-charm, its place in the circumcision ceremony being taken by long transverse flutes, which may be 2 m. in length. Dr. Rivers<sup>2</sup> has given evidence for the supplanting of the bullroarer by other noise-producing objects in southern Melanesia, so we need not hesitate to regard the flute as a later instrument which in some places has actually supplanted the bullroarer. The employment of long sacred flutes during initiation ceremonies is so peculiar that wherever we may find it in New Guinea we may regard its presence as a criterion of a cultural drift.

There is a group of Papuan-speaking, pottery-making tribes along the middle Keram, the most easterly southern tributary of the Sepik, of whom the Banaro may be taken as a type, as these have been carefully studied by Thurnwald. They are culturally quite distinct from the tribes along the Sepik. There are four Banaro villages, each composed of three to six hamlets of three to eight houses. Every hamlet has a special communal religious structure, *buek*, which Thurnwald calls the

<sup>1</sup> *Deutsch-Neu-Guinea*, Vol. i, p. 384.

<sup>2</sup> Rivers, W. H. R., *The History of Melanesian Society*, Cambridge, 1914, Vol. ii, p. 458.



"goblin-hall," the group of people (hamlet) belonging to a *buek* he terms a "gens." Each gens is divided into two "sibs," corresponding to each side of the *buek*; each forms a close, very friendly group. A *buek* is built on piles, and has a veranda at one end. At each side of the front part of the hall are two fireplaces for the corresponding sib, the left side is called *bon*, from the flutes, *bon morom*, "bamboo goblin." The right is called *tan*, and probably has a connection with the slit gongs. Spears are stacked at the end of the front part. At the end of the rear part are hidden the four sacred flutes, and on the sides are suspended beautiful ceremonial feather shields. The gens is exogamic, the tribe endogamic. Marriage must take place between members of the corresponding side of a *buek* of each gens, and so there is an exchange of girls. A second marriage takes place, and as each sib repeats what the other does, there are normally four marriages at a time. The paternal grandfather of each bridegroom is consulted, and he confers with his *mundu*, or special friend in the corresponding sib. The initiation ceremonies are intimately connected with the marriage rites, and comprise a number of complicated festivities.

The girls are confined in a cell in the family house for nine months, and drink sago soup instead of water, and the father sleeps in the *buek*. At the end of the period the girls are pushed into the river by the women and pelted with coconuts. That evening the orgy begins. The mother hands over the girl to the bridegroom's father, telling her that he will lead her to the goblin. He takes her to the *buek*, who passes her on to his *mundu*, who in the rôle of goblin leads her to the place at the end of the hall where the musical bamboo pipes (flutes) are hidden, where he initiates her into sexual life. Then the girl is led out of the *buek*, and her bridegroom's father restores her to her mother. The flutes play a most important part in many ceremonies. Their voice is supposed to be that of the goblin himself, and sight of them is forbidden to women on pain of death. The bridegroom's father returns to the hall to perform the rôle of goblin to the bride of his *mundu's* son. The other two girls are treated in a similar manner. The bridegrooms and other boys are confined in a special house and watched by their mothers' brothers. The fathers, in their capacity as goblins, are allowed to have intercourse with the brides on several subsequent occasions, but only in the *buek*. The bridegroom is not allowed to touch his bride until she gives birth to a child, called the goblin's child. The couple are finally permitted to begin married life without any further ceremony in a new house built by the bridegroom. On solemn occasions the goblin-father continues to exercise his "spiritual" function in the goblin-hall.

Boys of two sibs are initiated together. First the fathers consult together. The grandfathers, who acted reciprocally as goblin-fathers to the first-born, confer with the brothers of the respective mothers to plan a hunt of wild pigs. The goblin-fathers go in one party and the uncles in another; they return together with the pigs. The goblin-father cuts the pig in half, retaining one side and giving the other to the adopted father of the goblin child. The head is deposited in the *buek* before the flutes, and



is eaten by the two legal fathers and the two mothers' brothers. After sunset the *mundu* festival takes place. At this time the goblin-father ceases to exercise his right as representative of the goblin, ceding his power to his son, a man of the same age as the initiated woman's husband. From this time forth the husband's sib-friend, his *mundu*, acts as goblin on festive occasions. During these ceremonies in the *buek* the boys are brought to another house and there watched over by their mothers' brothers (uncles). When the father returns he brings a burning brand from the *buek*, and describes a circle of fire around his son's head. The fathers and uncles pick up the boys and carry them on their shoulders to the *buek*, and wait outside until all the men have entered. The men form a line across the hall and dance. Other men blow the flutes from behind the row of dancers. When the boys are brought into the hall the pipers burst through the row of dancers and press the flutes on the navels of the boys. After further ceremonies the boys are placed upon a piece of sago bark, and the fathers and uncles blow on the flutes. The boys are shown these instruments, and taught how to play them; subsequently the boys continually practice playing the flutes.

The boys are then confined in specially-built cage-like cells in the *buek*, and the edifice is fenced round. A good many ceremonies are performed during the period of seclusion, one being connected with the bullroarer. The barbed stems of *Coix lachrima* are inserted into the urethra and pulled out suddenly, so that the walls of the passage are cut. After three months of confinement the initiates are "shown" the phenomena of the world that surrounds them, animals, plants, high water, thunder, lightning, which are represented as spirits in the shape of wooden figures. They are also introduced to the goblins of this world and the spirits of their ancestors.

Five months later, during new moon, the fathers and mothers' brothers slaughter domestic pigs, as is usual at the conclusion of ceremonies. A feast is held to which the men of the related gentes bring vegetable food. Then they sing and dance day and night. Finally the boys are clothed with a fringed skirt and decorated, and tightly bound with a rattan wickerwork band. Their fathers offer them betelnut, and the mothers' brothers shave part of their heads. Each father gives to the boy of another gens a small wooden figure, *bukamorom*, which he has carved. The boy goes into the bush with this, and by arrangement a woman, usually the wife of the mother's goblin initiator, follows him. This is the boy's initiation into sexual life. At sunset the fathers and uncles carry the boys with the flutes on their shoulders to the river, where they are forced into the water with the flutes. The boys return to the *buek*. Next morning the adults of the community have a forced ceremonial immersion in the river, with sham fighting, sex against sex. The same evening the rite in the *buek* is repeated, but this time extended to the mothers' brothers and their *mundus*. The boys are brought home to their mothers, and then they may again associate with women.





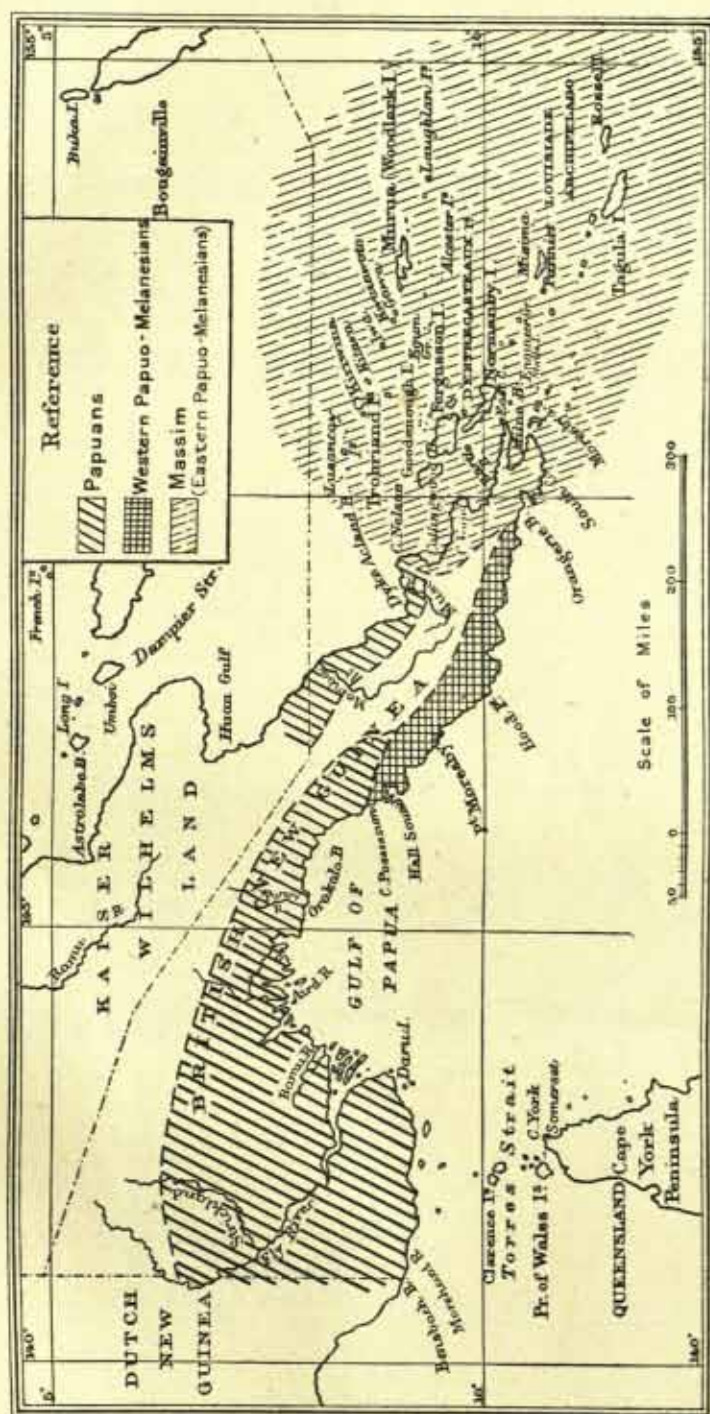
BRITISH NEW GUINEA

Statute Miles

MAP 1.—SKETCH MAP OF SOUTHERN BRITISH NEW GUINEA.  
From *The Melanesians of British New Guinea* (kindly lent by Prof. C. G. Seligman).







MAP II.—DIAGRAM SHOWING DISTRIBUTION OF PAPUANS AND PAPUO-MELANESIANS IN SOUTHERN BRITISH NEW GUINEA.











## ON A SERIES OF ANCIENT ESKIMO SKULLS FROM GREENLAND.

By W. E. LE GROS CLARK, F.R.C.S.

THE present communication was intended primarily as a report on a series of ancient Eskimo skulls in the possession of the anatomical department of St. Thomas's Hospital Medical School, in order to supplement our knowledge on the subject of Eskimo craniology. It will be seen, however, that I have extended the original field of enquiry by taking the opportunity of constructing a "type contour" of the Eskimo skull; by briefly summarising the data culled from other reports on Eskimo skulls; and by using the information thus obtained for a detailed examination of the reported Eskimo characteristics exhibited by certain human remains dating from the Magdalenian phase of the Palæolithic Period.

## I.

The collection of skulls here considered was brought from Greenland by Mr. J. Brierley, F.R.G.S., and presented to the Anatomical Department of St. Thomas's Hospital. It consists of eighteen complete and well-preserved crania, two of which are those of children. The latter are not included in the general description. In addition, nine mandibles were also secured, only one of which, however, corresponds to one of the collected crania.

Of the crania, two were taken from an old grave in Disco Island, while the remainder were obtained from a group of graves about twenty miles north of the village of Tasuisak in Melville Bay, North Greenland. The same precautions were observed in collecting these skulls as those described by Mr. Brierley in connection with the previous series which he obtained.<sup>1</sup> There can be little doubt, therefore, that the skulls are representative of an unmixed Eskimo population.

The skulls were individually examined, and any peculiarities or outstanding features noted down. Next, by means of a Martin's dioptograph, the *norma lateralis*, *norma verticalis*, *norma facialis*, and palatal contour were carefully traced out to half-scale, and the measurements of the contour thus obtained were subsequently checked by craniometrical observations on the skulls themselves.

The variation in the dimensions and proportions of the individual skulls can be seen by reference to the appended Table A.<sup>2</sup> With regard to the non-quantitative characters of the skulls, the following features were noted :—

<sup>1</sup> *Journ. Roy. Anthropol. Inst.*, vol. xxxvi, 1906, p. 104.

<sup>2</sup> The figures given in this table are reduced to half-scale, to correspond to the average contour.



1. *Sexual Differences*.—The difficulty of distinguishing the sex of these skulls with any degree of certainty is so great, that no attempt to do so has been made. This difficulty has been found by other observers. Søren Hansen, indeed, remarks: <sup>1</sup> "The sexual differences are in general so little noticeable that as a rule I have not deemed it necessary to take them into consideration."

2. *Scaphocephaly*.—The almost constant presence of this feature is very striking. The examination of these skulls confirms the statement of Parsons<sup>2</sup> and Duckworth<sup>3</sup> that scaphocephaly in the Eskimo skull is not related to premature synostosis along the sagittal suture. The median ridge commences, as a rule, some 3 inches anterior to the bregma. Posteriorly, about 1½ inches in front of the parietal foramina, the ridge divides to form two parasagittal crests enclosing the obelionic depression.

3. *Persistence of the infraorbital suture* was found in nine out of the sixteen adult skulls, while in a tenth the suture was visible but partially obliterated. This gives a high proportion of 56 per cent., as compared with Duckworth's observations on 209 skulls (47·8 per cent.).

4. *Muscular markings*.—Though variable, these are not on the whole well marked. The temporal ridges are the most conspicuous. The mastoid processes are generally small, while the external occipital protuberance and the markings for the nuchal muscles are poorly developed.

5. *The supraorbital ridges* are very rarely prominent.

6. *The thickening and porosity of the outer extremity of the tympanic plate*—previously remarked by Prof. Parsons—is surprisingly constant in this series.

7. *The simplicity of the sutural lines* is very evident—and especially so in connection with the coronal suture. In one case only out of twenty-one observations, the sagittal suture is recorded as being "well-serrated," while in four skulls it is "moderately serrated." The lambdoid suture, though usually simple, shows more variation, and may be very irregular. In consequence of this general sutural simplicity, wormian bones are distinctly uncommon in Eskimo crania.

8. *The torus palati* is conspicuous in only five out of the sixteen adult skulls.

9. The thickening and straightness of the lower border of the zygomatic arch has been noted before, and the great constancy of this feature is confirmed by the present series.

10. *The foramen magnum* shows no marked peculiarity.

11. The basioccipital bone is characteristically broad and flat.

12. The frequent presence of a well-marked irregular pit immediately in front of and external to the carotid opening, as previously described by Parsons, is confirmed by an examination of this series. It is an exaggeration of a small depression found in this situation in European skulls. I have satisfied myself, by the dissection

<sup>1</sup> *The Ammassalik Eskimos*, p. 17.

<sup>2</sup> *Journ. Roy. Anthropol. Inst.*, vol. xxxvi, 1906, p. 104.

<sup>3</sup> *Ibid.*, 1900, p. 125.



of two specimens in dissecting-room bodies, that it serves for the origin of the levator palati muscle.

13. *The mandibles* are remarkable for their well-marked muscular ridges, broad ascending rami, somewhat shallow sigmoid notches, and the prominence of the mylohyoid ridge on the internal aspect of the horizontal rami.

## II.—TYPE CONTOUR.

In the history of craniology, numerous attempts have been made to deal with the various races of men as the zoologist deals with the various species of a mammalian genus; to find some specific features which may serve to differentiate infallibly the skull of one race from the skull of another, in the same way that the concave post-orbital process distinguishes the skull of a fox from that of a dog. This method was carried to an extreme by Sergi when he subdivided the Mediterranean Race into a number of varieties, each characterized by the shape of the cranium as seen from above.

These attempts have all failed, and it must be realized that the variation of individual skulls of modern races is so great, that it is often extremely difficult to assign an isolated skull of unknown origin to a definite race with any degree of certainty.

To use biological terms, the races of mankind must be regarded (in so far as skulls are concerned) as "pure lines" or "elementary species," the curves of variation of which overlap so considerably that it is only possible to determine the essential differences between them by, so to speak, comparing the apices of the curves, and so eliminating all individual variation. This method has, it is true, been adopted by the use of a variety of numerical indices and cranial angles, but the limitations of these criteria are obvious. It is peculiarly difficult to form a mental picture of the "average skull" by studying long rows of measurements, indices, etc., and other non-quantitative features, such as the general shape of the skull, are left to the personal equation of the particular craniologist concerned.

The construction of a type contour obviates these difficulties, and it appears that further progress in the science of craniology can only take place by working out average contours of the skulls of the various races, thus forming accurate standards for comparative studies. Furthermore, average contours would seem to provide extremely interesting opportunities for investigating the immediate mechanical factors underlying racial variation in the shape of the skull.

Prof. Parsons originated the idea of constructing complete type contours of crania and mandibles, and his methods, which have been elsewhere fully described,<sup>1</sup>

<sup>1</sup> *Journ. Anat. & Phys.*, vol. xlv, 1910, p. 396; *Journ. Roy. Anthropol. Inst.*, vol. xliii, p. 550. A similar idea, based on a different method, was originated independently by Dr. Crewdson Bennington.



I have adopted practically in their entirety. Any differences are merely differences of detail. Thus, I have, in the *norma lateralis*, added another radius at right angles to the base-line, for this line as a rule passes through the highest point of the cranial vault. Again, in constructing the palatal contour, I have taken the breadth measurements between the inner borders of the teeth sockets and the outer alveolar margin, rather than between the inner and outer margins of the teeth themselves. This has been necessary, because most of the teeth in this series of Eskimo skulls were absent.

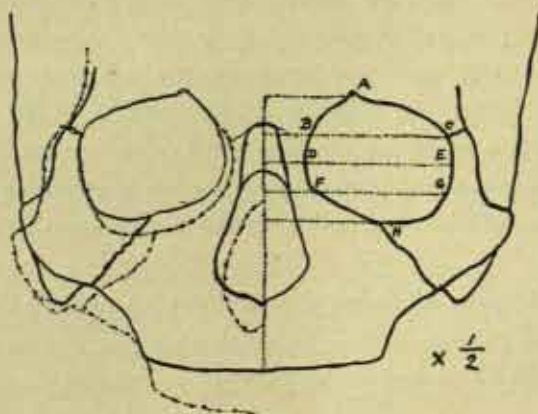


FIG. 1.

—— TASMANIAN (15) (BERRY).  
 ..... ESKIMO (16) (*mihi*).

A. Supraorbital notch. BC. Level of fronto-malar suture. DE. Level of least interorbital width. FG. Level midway between FG and H. H. Lower orbital margin.

This figure indicates that—assuming the nasion to be a fixed point—the height of the orbit depends upon the elevation or depression of the lower orbital margin.

In the construction of the *norma verticalis* and *norma facialis*, I have orientated the skulls by means of the Frankfurt plane. I am aware that this plane has been several times severely criticized, and in so far as the plane is used in the formation of "angles," and indiscriminately in the comparison of skulls of widely differing form, the criticism is undoubtedly justified. The chief value of the Frankfurt plane is, however, to provide a means for orientating the skull in order to obtain a *norma verticalis* and *norma facialis* that will give a direct and not an oblique view of the top of the cranium, and the face, respectively.<sup>1</sup>

<sup>1</sup> It is interesting to note, in this connection, that in a communication in which he advocates the substitution of a nasi-meatal for the Frankfurt plane, Pycraft gives a tracing of the *norma verticalis* of a skull which has been orientated for this purpose practically on the Frankfurt plane.

Pycraft<sup>1</sup> has indicated that the direction of the Frankfurt plane will vary with the depth of the orbits. He implies that the depth of the orbit depends upon the raising or lowering of the lower orbital margin rather than the movement of the upper margin. In order to test this statement, I have compared the facial contours of different races, with especial reference to the shape of the orbits. The points which I have used in working out the orbital contours are indicated in Fig. 1. In this diagram the average facial contour of the Eskimo skull is superimposed on the average contour of fifteen Tasmanian skulls, which I constructed from Berry's<sup>2</sup> contours. The interesting fact is brought out by this comparison that the marked difference in the orbital height of these two races depends wholly on the elevation

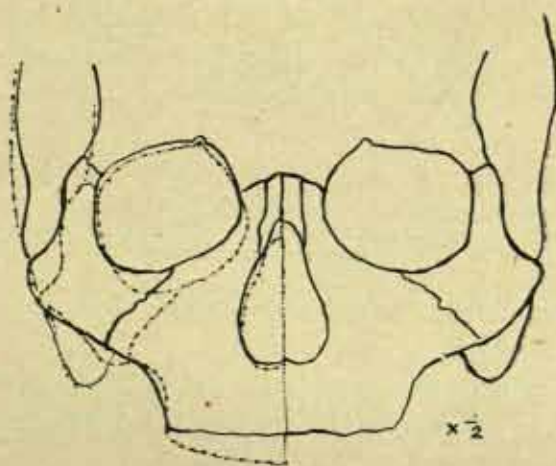


FIG. 2.

—— NEOLITHIC (14) (PARSONS).  
 ..... MODERN ENGLISH (15) (PARSONS).

Assuming that the nasion is a fixed point, the figure indicates that the comparative height of the English orbit is entirely due to the depression of the lower orbital margin.

or depression of the lower orbital margin, if the nasion is regarded as a fixed point.

In Fig. 2, again, the average contour of fourteen Neolithic skulls is superimposed in the same way as that of fifteen modern English skulls. Here, also, the superior orbital margins practically coincide, while the inferior orbital margins differ widely in their level. Both these diagrams seem to indicate a very definite relation between the orbital height and the facial height.

<sup>1</sup> "A Plea for a substitute for the Frankfurt Base-Line," *Man*, vol. xv, No. 7.

<sup>2</sup> *Transactions of the Roy. Soc. of Victoria*, vol. v, Part I, 1909.



In Fig. 3, I have superimposed the orbital contours of four individual skulls of different ages to show that the increase in the orbital height after birth appears

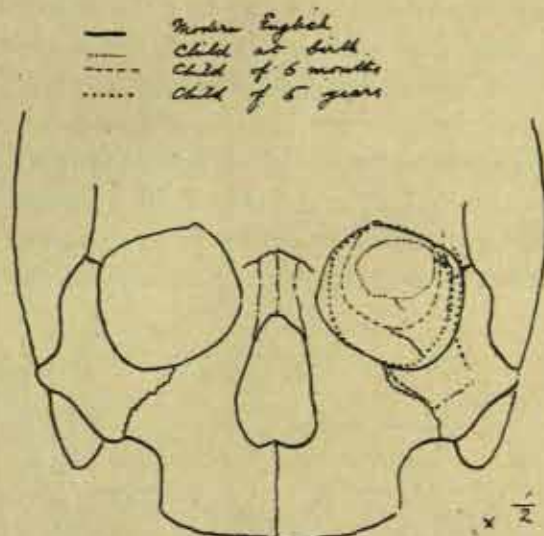


FIG. 3.—ORBITAL CONTOURS SUPERIMPOSED, USING THE NASION AS A FIXED POINT.

to take place almost entirely by the depression of the lower, and not by the elevation of the upper orbital margin.

The average contours here shown are based on the measurements of sixteen skulls, and it may be objected that this number is not sufficiently large. That this

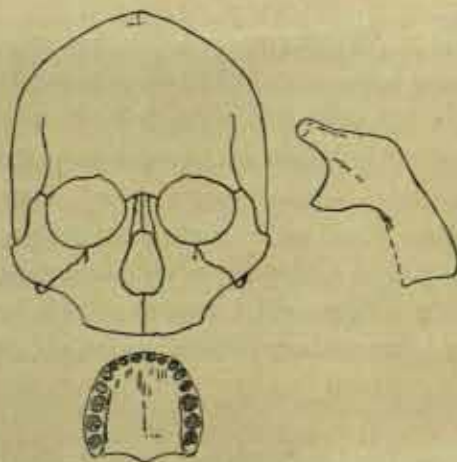


FIG. 4.—AVERAGE CONTOURS OF NORMA FACIALIS, PALATE AND MANDIBLE. ESKIMO.  $\times \frac{1}{4}$ .

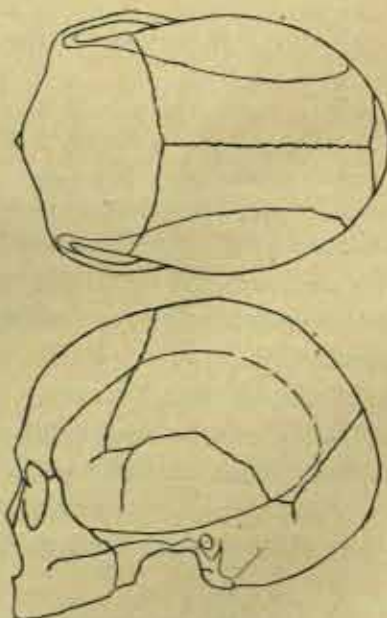


FIG. 5.—AVERAGE CONTOURS OF NORMA VERTICALIS AND NORMA LATERALIS.  $\times \frac{1}{4}$ .

objection is not valid will be seen by reference to Table B, where a number of measurements of the composite contour are compared with corresponding measurements obtained by adding in those recorded by other observers. It will be seen that the figures correspond very closely—the greatest divergence only amounting to .9 mm. in the half-size reproduction, or 1.8 mm. in the life-size skull. We may, therefore, take it that these tracings represent fairly accurately the standard Eskimo skull, the essential features of which are at once apparent on examining the contours.

For comparative purposes, I have, in Fig. 6, superimposed the Eskimo type contours on those based on thirty male English skulls, as constructed by Prof. Parsons.

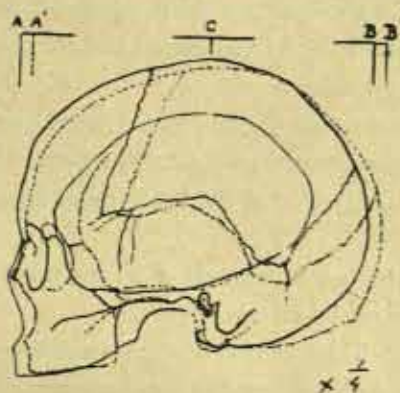


FIG. 6.

—— ESKIMO.  
 ..... MODERN ENGLISH.

Briefly, the following points call for attention :—

*N. lateralis*—

- (a) This view reveals a predominance of frontal over occipital development in the Eskimo skull. The characteristic length of the cranium is, in fact, due to a prolongation in front of rather than behind a vertical line drawn through the centre of the external auditory meatus, constituting a condition of anterior dolichocephaly as compared with the posterior dolichocephaly of the English skull. This may be expressed by saying that (in Fig. 6)  $AC > BC$ . That this appearance is not due merely to an alteration in the relative position of the meatus is shown by the fact that the asterionic points lie on the same vertical plane, while the occipital condyles practically coincide.
- (b) The forward projection of the skull is partly due to the greater anterior extension of the squamosal bone and the marked width of the great sphenoidal wing, and more so to the great length of the zygomatic process



of the temporal bone. This latter factor has led to a rotation forwards of the lower and lateral parts of the facial skeleton, resulting in a slight degree of relative prognathism, and in a broadening and flattening of the face.

- (c) The straightness of the lower margin of the zygomatic arch is very obvious, and appears to be associated with the length of the arch. The comparative recession of the face and frontal region of the English skull has, so to speak, led to a "buckling" upwards of the zygomatic arch, producing the concavity of the lower margin.
- (d) The inion is situated above the base-line employed.

*N. verticalis*.—The long and narrow shape of the skull is well seen in this view. The relatively great width of the frontal region and the marked development of the zygomatic arches are very conspicuous.

*N. facialis*.—This contour shows the characteristic long and narrow nasal skeleton, the great height and width of the orbits, the facial height and width, and the scaphocephalic features, as illustrated by the parallel lateral cranial walls, and the median sagittal ridge.

*Palatal contour*.—Attention is here called to the relative breadth of the palate, and the elliptical contour of the alveolar border.

*Contour of mandible*.—This is based on nine specimens only, and is thus open to criticism. It shows a broad ascending ramus surmounted by a comparatively shallow sigmoid notch.

### III.

The resemblance between the Magdalenian culture and that of the modern Eskimo has long been realized, and this resemblance has been adjudged sufficiently close by some authorities to warrant the inference that the Magdalenians were indeed Eskimos.

Boyd Dawkins<sup>1</sup> argued that the Eskimo originated in Central Europe in the glacial epoch, and followed the reindeer northwards with the retreat of the glacial sheets till they reached their present habitat. This suggestion has received much opposition since it was first put forward, and the opposers raise strong objections to its acceptance.<sup>2</sup> It may be noted here that many of the theoretical objections will disappear if we regard the problem in a different light. Good reasons have been adduced in support of the contention that the various races of mankind were differentiated long before the Magdalenian Period,<sup>3</sup> and we may assume, till evidence to the contrary is presented, that the Eskimo lived along the Arctic fringe during

<sup>1</sup> *Cave-Hunting*, 1874; *Early Man in Britain*.

<sup>2</sup> Steesky, *Om Eskimo-kulturens Oprindelse*, Copenhagen, 1905; Dechelette, *Man. d'Archéologie Préhistorique*, 1908.

<sup>3</sup> Keith, *Antiquity of Man*.

Palæolithic times. Then with the onset of each glacial phase, they must have been pushed southwards by the advancing ice sheet, and it is by no means improbable that a few tribes may have trickled into Central Europe with the reindeer and musk-ox. It is, in fact, more likely that the Eskimo followed the reindeer down to France than that he followed it up to Siberia. Either of these theories, however, can only be proved by osteological evidence; that is, by the discovery of human remains which are unequivocally those of an Eskimo.

The majority of human remains dating from the Magdalenian Period may be assigned fairly certainly to the so-called "River-bed" race, and this indicates that if Eskimos were in Europe at that time, they must have been in a very small

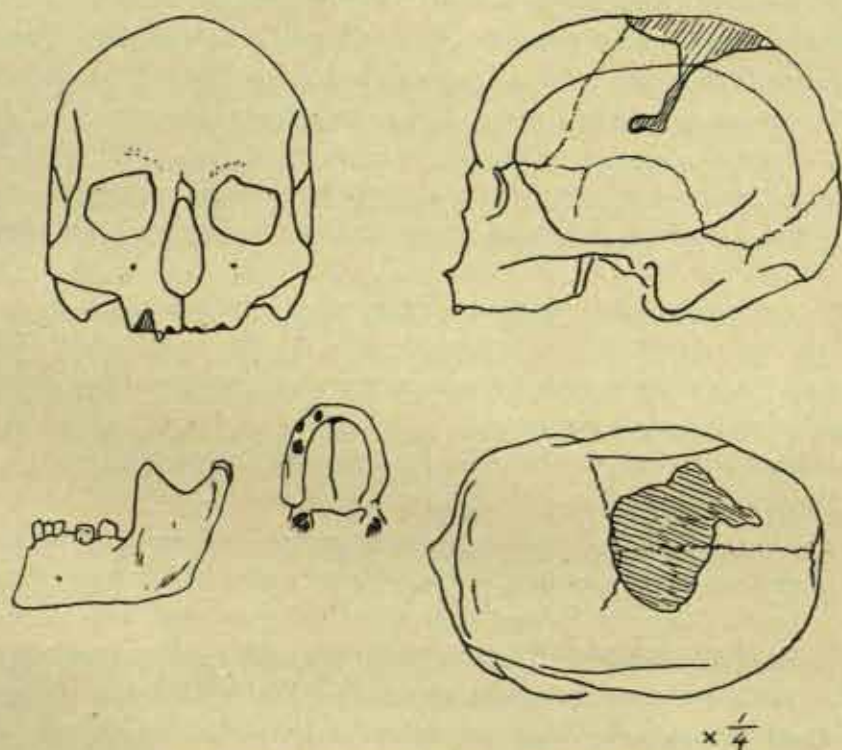


FIG. 7.—THE CHANCELADE SKULL (AFTER TESTUT).

minority. Of particular interest, therefore, is the almost complete skeleton found at Chancelade, which has been claimed as a representative of this hypothetical minority. This skeleton was fully described by Testut in 1889,<sup>1</sup> and the contours of the skull here reproduced (Fig. 7) are taken from the original figures. It will be instructive to compare, point by point, the Chancelade skull with the standard Eskimo skull constructed above.

It should be mentioned here that the vault of the Chancelade skull has been broken over the area indicated in the diagram, by the spade of the excavator; the right

<sup>1</sup> *Bull. de la Soc. d'Anthr. de Lyons*, 1889.



temporal region, also, shows evidence of an old fracture which has produced a slight flattening in this region.

1. *Cranial capacity*.—This is remarkably large in the Chancelade skull—1730 cc.—but it is not outside the variation found in Eskimo crania (Duckworth records 1775 cc. for one skull). Any objection raised on the grounds of cranial capacity against assigning the Chancelade skeleton to the Eskimo race must also apply equally in regard to other modern races.

2. *Sutures*.—It is interesting to note that the coronal suture is described by Testut as “remarquable par sa simplicité.” This accords with the general condition found in Eskimo skulls. The sagittal suture, however, is “fort complexe,” and the lambdoid suture “un peu plus complexe.” This complexity, which is illustrated by drawings, is not the usual character of these sutures in Eskimo skulls, though it may be present. Wormian bones are noted as being absent in the Chancelade skull.

3. No mention is made by Testut of a persistent infraorbital suture.

4. *Muscular markings* are well developed in the Chancelade skull, and especial attention is drawn to the “developpement tout particulier de ses apophyses mastoïdes.” Such a development, though uncommon, can be matched in some Eskimo skulls.

5. *The supraorbital ridges* are poorly developed, as in most Eskimo.

6. The lower border of the zygomatic arch has the characteristic Eskimo appearance of straightness, and the arch, moreover, is noted as being especially developed “dans le sens de l'épaisseur.”

In comparing the contours, the following points deserve attention :—

A. *Norma lateralis*—

- (1) The Chancelade skull shows a relatively greater development of the frontal and smaller development of the occipital region. It is in these characteristics that the Eskimo skull differs from the type skulls of modern English, Neolithic, and River-bed races. These characteristics may, therefore, be regarded as exaggerations of Eskimo traits.
- (2) The great breadth of the great wings of the sphenoid is obvious, and, indeed, Testut remarks : “La portion de ces grandes ailes qui fait partie de la fosse temporale est remarquable tout d'abord par sa grande largeur.”
- (3) The inion is situated well above the base line.

B. *N. facialis*.—The Chancelade skull has been orientated on the alveolo-condylar plane, and thus the contours of the cranial vault are not strictly comparable. The scaphocephaly of the Chancelade skull is, however, quite evident.

- (1) The nasal skeletons in the two contours closely correspond, and their indices are practically identical.
- (2) The characteristic facial length of the Eskimo is reproduced in the Chancelade skull to a slightly exaggerated degree.

- (3) The frontal width of the Chancelade skull is relatively great, again accentuating an Eskimo trait.
- (4) The orbits show peculiarities. In the first place, they are surprisingly small, the height being 33 mm., and the breadth 38 mm. These low figures are found only occasionally among Eskimo skulls, and then only (so far as records at my disposal show) in skulls of less than average size. The size of the Chancelade skull is, on the other hand, relatively large. The orbital index of the Chancelade skull is 87, and thus classes it as mesoseme. The lowness of the orbits, it will be noticed, is due rather to the low position of the upper margin than to the high level of the lower margin. The upper margin, in fact, hardly rises above the level of the nasion.

*N. verticalis*.—Comparison is again hindered by the alveolo-condylar orientation of the skull. The relative width of the frontal region is well seen.

*Palate*.—This contour differs very markedly from that of the Eskimo. Compared with the latter, the palate of the Chancelade skull is long and narrow, with an index of 67·9. This falls within the limits of Eskimo variation, but it is exceptional to find an Eskimo palate with an index below 70.

*Limb bones*.—The humerus, femur and radius of the Chancelade man were well preserved, and so allow the calculation of the humero-radial and humero-femoral indices. The disparity between these and those of the Eskimo can be seen by the following figures, and they argue distinctly against the Eskimo affinities of the Chancelade skeleton :—

|           |       | Av. : Eskimo. | Av. : English.   | Chancelade. |
|-----------|-------|---------------|------------------|-------------|
| Hum. rad. | .. .. | 71·8 (Turner) | 72·5 (Duckworth) | 83·0        |
| Hum. fem. | .. .. | 77·7 (Turner) |                  | 73·5        |

The conclusion to be drawn from this comparison must be of a negative nature. The Chancelade skull certainly presents some remarkable Eskimo characteristics. These, however, are more than balanced by a number of features which are unusual in Eskimo skulls. It must, therefore, be conceded that there is no justification for the assertion that "L'Homme de Chancelade" is a representative of an Eskimo population which lived in France during the late Palæolithic Period.



TABLE AI.—*Norma Lateralis* (radii taken from mid-point of auditory meatus).

| No. of skull ...                    | 1              | 2             | 3           | 4          | 5            | 6             | 7           | 8           | 9             | 10         | 11          | 12            | 13          | 14          | 15           | 16           | Av.           |
|-------------------------------------|----------------|---------------|-------------|------------|--------------|---------------|-------------|-------------|---------------|------------|-------------|---------------|-------------|-------------|--------------|--------------|---------------|
| Post. angle of Ext. Pterygoid plate | 123°<br>20     | 124.5<br>22.5 | 125<br>22.5 | 125<br>22  | 120<br>15.5  | 125.5<br>25   | —<br>—      | 121<br>25   | 129.5<br>25.5 | 122<br>27  | 125<br>25   | 123.5<br>22.5 | 124<br>15.5 | 119<br>17   | 126<br>21    | 125<br>17    | 123.9<br>21.5 |
| Tub. of Maxilla ...                 | 113°<br>29     | 124.5<br>27.5 | 126.5<br>30 | 123<br>26  | 124.5<br>27  | 125.5<br>28.5 | 117<br>28   | 124<br>30   | 128<br>29     | 124<br>33  | 123<br>27.5 | 110.5<br>28   | 130<br>26.5 | 123.5<br>28 | 122<br>25    | 123<br>27    | 123.4<br>28.1 |
| Prosthion ...                       | 115°<br>54     | 115<br>52.5   | 115<br>52.5 | 114<br>53  | 116<br>52.5  | 117.5<br>55.5 | 114<br>56.5 | 115<br>55.5 | 118<br>56.5   | 116<br>61  | 115<br>55   | 112.5<br>47   | 118<br>48   | 117<br>54.5 | 114<br>48    | 114<br>53    | 115.4<br>52.7 |
| Nasal Spine ...                     | 106.5°<br>51.5 | 103<br>47.5   | 106.5<br>48 | 105<br>49  | 107<br>50.5  | 106.5<br>53   | 106<br>55.5 | 107<br>51   | 107.5<br>52.5 | 107<br>56  | 106<br>49   | 105<br>45     | 106<br>43   | 107<br>51   | 107<br>45.5  | 104<br>51    | 106.1<br>49.9 |
| Inf. orbital margin (90°)           | 43             | 43            | 42.5        | 44         | 44           | 45            | 47          | 46          | 46.5          | 48         | 44          | 39.5          | 40          | 44          | 43           | 44           | 44.6          |
| Upper end of temp. malar suture     | 90°<br>30      | 85<br>30      | 90<br>29    | 85<br>31   | —<br>—       | 88<br>30      | 89<br>31    | 87<br>30    | 86<br>31      | —<br>—     | 90<br>30.5  | 87<br>27      | 87<br>30.5  | 84.5<br>30  | 90<br>30.5   | 87<br>30     | 87.5<br>30    |
| Nasal point ...                     | 88°<br>52.5    | 85<br>49      | —<br>—      | 87<br>48.5 | 84<br>50     | 84<br>53.5    | 88<br>56    | 88<br>53.5  | 86<br>53.5    | 87<br>56   | 86.5<br>52  | 83<br>47.5    | 87<br>45.5  | 87<br>52    | 87<br>47     | 86<br>51.5   | 86.2<br>51.2  |
| Nasion...                           | 76°<br>50      | 74<br>48      | 75<br>48    | 73<br>48.5 | 76<br>49.5   | 75<br>51.5    | 75<br>54    | 75<br>52.5  | 76.5<br>53.5  | 74<br>54   | 76<br>50    | 74<br>47      | 74<br>46    | 74<br>49.5  | 75.5<br>47.5 | 76<br>49     | 74.9<br>49.9  |
| Ant. end of Fr. malar suture        | 73°<br>44.5    | 71<br>41.5    | 72.5<br>43  | 69<br>43   | 72<br>44     | 75<br>44.5    | 73<br>46    | 71.5<br>46  | 71<br>46      | 72<br>47.5 | 73<br>42.5  | 72.5<br>39.5  | 72<br>42    | 70<br>44.5  | 71<br>43     | 69.5<br>42.5 | 71.8<br>43.8  |
| Sup. orbital margin ...             | 71°<br>49      | 69<br>47      | 69<br>48    | 65<br>47.5 | 69<br>52     | 70.5<br>51    | 70<br>51.5  | 68<br>53.5  | 70<br>51.5    | 69<br>53   | 69<br>49    | 69<br>44.5    | 70<br>45.5  | 67<br>51    | 69<br>47.5   | 68<br>48     | 68.9<br>49.3  |
| Glabella ...                        | 67.5°<br>50.5  | 66<br>53      | 69<br>52    | 65<br>53   | 67.5<br>54.5 | 67<br>57      | 70<br>58.5  | 68<br>57    | 70<br>57      | 69<br>57   | 69<br>53    | 60.5<br>51    | 67<br>50    | 67<br>50    | 69<br>54     | 68<br>51     | 67.8<br>54.2  |

|                                   |                |             |              |              |              |               |             |              |              |              |             |             |              |             |             |             |               |
|-----------------------------------|----------------|-------------|--------------|--------------|--------------|---------------|-------------|--------------|--------------|--------------|-------------|-------------|--------------|-------------|-------------|-------------|---------------|
| Supraglabellar depression         | 60.5°<br>58    | 61<br>54    | 62<br>54     | 59.5<br>54.5 | 59.5<br>57   | 61.5<br>57    | 60<br>59    | 58<br>60     | 61.5<br>59   | 59.5<br>54   | 66<br>52    | 60<br>52    | 62<br>52     | 61.5<br>56  | 62<br>53    | 62.5<br>54  | 61.3<br>55.9  |
| Frontal eminence ...              | 53°<br>62      | 45<br>59.5  | 52<br>58     | 51<br>57.5   | 49<br>61     | 52<br>63      | 52<br>61.5  | 52<br>61.5   | 49.5<br>61.5 | 59<br>56.5   | 59<br>56    | 49<br>56    | 52<br>57     | 48<br>60.5  | 49<br>58    | 53<br>57.5  | 51.0<br>59.8  |
| Ant. end of sphenoparietal suture | 53°<br>36      | 45<br>34    | 54<br>32.5   | 48<br>35     | 55.5<br>36.5 | 52.5<br>37    | —<br>—      | —<br>—       | 54<br>32     | 60<br>36.5   | 56<br>34    | 56<br>34    | 52<br>32     | 50<br>35    | 49<br>33.5  | 53<br>32.5  | 52.1<br>34.3  |
| Post end of suture ...            | 43°<br>31      | 41<br>29    | 52<br>31     | 37<br>28     | 42<br>32     | 41.5<br>31.5  | 36.5<br>34  | 36.5<br>31.5 | 45.5<br>28.5 | 51.5<br>31.5 | 30<br>26    | 30<br>26    | 36.5<br>26.5 | 41<br>31    | 41<br>32    | 40<br>29.5  | 41.8<br>30.0  |
| 30° ...                           | 63.5           | 60          | 59           | 62           | 62           | 65            | 64.5        | 65           | 62           | 59           | 59          | 59          | 60.5         | 61.5        | 60.5        | 58          | 61.0          |
| Stephanion ...                    | —              | 19.5<br>50  | 32.5<br>46   | 19.5<br>50   | 28<br>52     | 30<br>49      | 30<br>51    | 30<br>51     | 18<br>55     | 33.5<br>53.5 | 25<br>46    | 25<br>46    | 18<br>—      | 25<br>50.5  | 24<br>49    | 23<br>48.5  | 25.1<br>48.8  |
| Bregma ...                        | 17°<br>63      | 17<br>59    | 18.5<br>60.5 | 13<br>62     | 17<br>61.5   | 20<br>65.5    | 16.5<br>63  | 17.5<br>63   | 14<br>62.5   | 15<br>59     | 12<br>60.5  | 12<br>60.5  | 13<br>60.5   | 12<br>63    | 16<br>61    | 10.5<br>57  | 15.5<br>61.6  |
| 360° ...                          | 64             | 61          | 62.5         | 65           | 62           | 67            | 62          | 64           | 63.5         | 62           | 60.5        | 60          | 62           | 63          | 64          | 57.7        | 62.5          |
| 340° ...                          | 60.5           | 60          | 58.5         | 64           | 60           | 63            | 59          | 61           | 59           | 59           | 57          | 59          | 62           | 62.5        | 60.5        | 56          | 60.1          |
| Lambda ...                        | 318.5°<br>55.5 | 303<br>53.5 | 319<br>53.5  | 312<br>56    | 314.5<br>52  | 318.5<br>55   | 312<br>51   | 318<br>54    | 326<br>54    | 317<br>52.5  | 319<br>51.5 | 310<br>51   | 312<br>55    | 309<br>53   | 316<br>54   | 303<br>49   | 314.2<br>53.2 |
| Occipital pole...                 | 300°<br>49     | 292.5<br>46 | 296<br>46    | 295<br>50    | 293<br>47    | 298.5<br>49.5 | 294<br>46   | 291<br>48    | 297<br>46.5  | 293<br>45.5  | 301<br>44   | 290<br>46.5 | 296<br>49    | 293<br>48.5 | 294.5<br>49 | 295<br>44   | 294.7<br>47.3 |
| Astion ...                        | 296°<br>26     | 296<br>26   | 296<br>24    | 295<br>25.5  | 306<br>19    | 303<br>25     | 294<br>20   | 295<br>25    | 303<br>26    | 293<br>23.5  | 299<br>25   | 290<br>26   | 293<br>26.5  | 289<br>26   | 297<br>27   | 292<br>23   | 296.1<br>24.6 |
| Inion ...                         | 282°<br>41     | 278<br>40.5 | 289<br>43    | 271<br>36    | 284<br>42.5  | 271<br>41     | 273<br>35   | 276<br>40    | 282<br>38.5  | 278<br>40.5  | 284<br>35   | 270<br>39   | 284<br>44    | 279<br>43   | 281.5<br>43 | 276<br>34.5 | 278.7<br>39.8 |
| Mid-point of Inion-condylar arc.  | 260°<br>26     | 256<br>27.5 | 257<br>26    | 249<br>25    | 262.5<br>33  | 254<br>27     | 247<br>23.5 | 257<br>26    | 264<br>28    | 254<br>27.5  | 252<br>19   | 253<br>27.5 | 255<br>22    | 254<br>27   | 258<br>30   | 253<br>25   | 255.5<br>26.9 |



*Norma Lateralis*—continued.

| No. of skull.  | 1            | 2          | 3         | 4          | 5        | 6         | 7           | 8           | 9           | 10        | 11        | 12        | 13          | 14        | 15       | 16          | Av.           |
|----------------|--------------|------------|-----------|------------|----------|-----------|-------------|-------------|-------------|-----------|-----------|-----------|-------------|-----------|----------|-------------|---------------|
| Tip of mastoid | 218°<br>11.5 | 22.5<br>11 | 220<br>12 | 210.5<br>9 | 209<br>9 | 210<br>10 | 207.5<br>12 | 202<br>10.5 | 211<br>12.5 | 194<br>12 | 207<br>11 | 208<br>11 | 208<br>10.5 | 217<br>10 | 210<br>9 | 219<br>12.5 | 211.4<br>10.8 |
| 180° ...       | 8            | 10         | 9         | 11         | 11       | 7         | 11.5        | 10          | 9           | 14        | 8         | 9         | 10          | 12        | 7        | 9           | 9.8           |

TABLE A2.—Measurements of *N. Facialis*.

| No. of skull  | 1               | 2              | 3             | 4             | 5                | 6                  | 7                | 8                 | 9                | 10               | 11                 | 12               | 13               | 14              | 15                 | 16               | Av.                  |
|---|-----------------|----------------|---------------|---------------|------------------|--------------------|------------------|-------------------|------------------|------------------|--------------------|------------------|------------------|-----------------|--------------------|------------------|----------------------|
| Vertex...   | 49.5            | 44.5           | 48            | 48.5          | 45               | 51                 | 44               | 41                | 49.5             | 45.5             | 44                 | 44.5             | 47.5             | 47              | 49                 | 44               | 46.4                 |
| 45 mm.  | 29.5            | 5              | 18            | 26            | 0                | 32                 | 11.5             | 16                | 29.5             | 11               | 8                  | 9                | 19               | 16.5            | 25                 | 11               | 11.1                 |
| 40 mm.  | 43.5            | 26.5           | 33.5          | 42.5          | 29               | 45                 | 26               | 31                | 48               | 31               | 22.5               | 27               | 38.5             | 33.5            | 40.5               | 26.5             | 34.0                 |
| 35 mm.  | 53              | 42             | 48.5          | 54.5          | 44.5             | 55                 | 41.5             | 46.5              | 59               | 43.5             | 43                 | 43               | 50.5             | 47              | 51.5               | 43               | 47.9                 |
| 30 mm.  | 59.5            | 51             | 58.5          | 62            | 55.5             | 61.5               | 53.5             | 57.5              | 65               | 53.5             | 54.5               | 55               | 58.5             | 56              | 58.5               | 52               | 57.0                 |
| 20 mm.  | 64.5            | 60             | 65            | 69            | 66.5             | 67                 | 63               | 63.5              | 70.5             | 64               | 63.5               | 64.5             | 65.5             | 65              | 64                 | 59               | 64.7                 |
| 10 mm.  | 66.5            | 64             | 66.5          | 70            | 70.5             | 70                 | 65.5             | 65                | 72               | 67.5             | 65                 | 67.5             | 69               | 69              | 66.5               | 61.5             | 67.3                 |
| Supraorb. notches   | 5<br>23         | 4<br>19.5      | 5<br>25.5     | 4<br>25       | 4<br>25          | 5<br>26            | 2.5<br>27        | 5.5<br>25         | 6<br>25.5        | 4<br>27          | 4<br>18            | 3<br>23          | 3<br>20.5        | 4.5<br>26.5     | 5<br>22.5          | 6<br>20.5        | 4.0<br>23.7          |
| Least frontal width   | 10<br>46.5      | 10<br>48       | 8<br>49       | 10<br>49.5    | 10<br>50         | 12.5<br>50.5       | 9<br>52          | 10<br>45.5        | 10<br>52         | 10<br>48.5       | 8<br>46            | 6.5<br>44.5      | 8<br>45          | 7.5<br>50       | 8.5<br>46.5        | 10<br>47.5       | 9.3<br>48.2          |
| Ext. Ang. Process<br>(+ = above nasion)<br>(- = below nasion) | 0<br>49<br>64.5 | -1<br>48<br>64 | 0<br>48<br>66 | 0<br>49<br>69 | -2<br>51<br>69.5 | -1.5<br>50<br>70.5 | -4.5<br>50<br>64 | 0<br>48.5<br>65.5 | +3<br>51.5<br>72 | -1<br>51<br>66.5 | -1<br>48.5<br>63.5 | -2<br>47.5<br>67 | -1<br>45.5<br>67 | 0<br>40.5<br>69 | +1<br>45.5<br>66.5 | +1.5<br>47<br>61 | -0.5<br>49.3<br>66.6 |

|   |            |               |              |          |              |              |             |              |              |             |            |            |              |             |            |               |
|---|------------|---------------|--------------|----------|--------------|--------------|-------------|--------------|--------------|-------------|------------|------------|--------------|-------------|------------|---------------|
| Interorbital width ...                    | 4<br>9     | 4<br>5<br>7.5 | 4<br>9       | 4<br>8   | 7<br>9       | 4<br>8       | 4<br>5<br>7 | 3<br>5<br>9  | 5<br>9       | 3<br>5<br>7 | 6<br>9     | 5<br>7     | 6<br>11      | 3<br>5<br>7 | 3<br>7     | 4<br>7<br>8.4 |
| Nasal point ...                           | 12         | 8             | —            | 7.5      | 13           | 12.5         | 11.5        | 8            | 12           | 10.5        | 8.5        | 11         | 11           | 11          | 9          | 10.3          |
| Inf. orb. margin and<br>bizygomatic width | 13<br>66   | 13.5<br>66.5  | 12<br>66.5   | 15<br>73 | 16<br>65.5   | 16.5<br>66.5 | 14<br>65.5  | 13<br>75.5   | 15.5<br>73   | 14<br>65    | 14.5<br>65 | 14<br>66.5 | 14<br>70     | 13<br>64    | 12<br>66   | 14.0<br>67.9  |
| Max. nasal width                          | 19<br>10.5 | 21<br>10      | 18<br>12     | 22<br>11 | 24.5<br>10.5 | 23<br>10.5   | 22<br>12    | 20.5<br>12   | 23<br>10     | 20.5<br>12  | 19<br>10   | 18<br>10.5 | 23<br>12     | 19<br>12.12 | 17.5<br>10 | 20.6<br>11.1  |
| Bimax width ...                           | 22.5<br>49 | 22<br>49      | 22<br>49     | —<br>—   | —<br>—       | 27<br>54     | 25.5<br>53  | 24.5<br>57.5 | 25.5<br>54.5 | 24<br>46    | 22<br>45   | 21.5<br>47 | 25.5<br>53.5 | 23<br>46    | 21<br>51   | 23.9<br>50.0  |
| Nasal spine ...                           | 26         | 25.5          | 22           | 28       | 27           | 30           | 27          | 26           | 30           | 27.5        | 25         | 24         | 28           | 24.5        | 23.5       | 26.1          |
| Max. tuberosities                         | 31.5<br>32 | 33<br>29      | 32.5<br>29.5 | 35<br>32 | 35<br>30     | 36<br>30.5   | 35<br>31    | 37<br>34.5   | 37<br>34     | 33<br>32.5  | 30<br>21.5 | 32<br>30.5 | 34.5<br>32   | 30.5<br>28  | 31<br>32   | 33.6<br>30.7  |
| Prosthion ...                             | 36         | 36            | 34.5         | 38       | 36.5         | 38.5         | 38          | 40           | 41.5         | 38          | 32.5       | 37.5       | 39           | 32.5        | 33         | 37            |



TABLE A3.—Norma Verticalis.

| No. of skull ...              | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | Av.  |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Nasal point ...               | 1.5  | 1.5  | 1.5  | 2    | 0    | 3    | 3    | 1    | 0    | 3    | 3    | 1.5  | 0    | 0    | 0    | 3.5  | 1.4  |
| Ant. limit of temporal crests | 9    | 11   | 10   | 10.5 | 9    | 11   | 12   | 10   | 12   | 10   | 9.5  | 11   | 6.5  | 9    | 8.5  | 10   | 9.9  |
|                               | 56   | 54.5 | 56   | 58   | 54   | 63   | 55   | 52.5 | 63.5 | 62.5 | 53   | 52.5 | 47   | 54.5 | 53.5 | 57.5 | 55.8 |
| Least frontal width ...       | 11   | 13   | 14.5 | 12   | 11.5 | 12   | 12.5 | 12.5 | 13   | 12   | 11   | 13   | 8    | 11   | 11.5 | 12   | 11.9 |
|                               | 46.5 | 47   | 49   | 50   | 49   | 51   | 50   | 45.5 | 53   | 48.5 | 47   | 44.5 | 45   | 50.5 | 47   | 47.5 | 48.2 |
| $\frac{1}{2}$ ...             | 55.5 | 53.5 | 57.5 | 58   | 58.5 | 59.5 | 55   | 54   | 59   | 56.5 | 55.5 | 55.5 | 56   | 58   | 57.5 | 54   | 56.5 |
| Max. bizygomatic width        | 24.5 | 26.5 | 24   | 22   | 30   | 27   | 26   | 26.5 | 30.5 | 27   | 25   | 23.5 | 27   | 28   | 22.5 | 22   | 25.8 |
|                               | 56   | 55   | 58   | 57   | 64   | 61.5 | 55   | 54   | 63.5 | 58   | 56   | 55.5 | 58   | 60   | 57.5 | 54   | 57.7 |
|                               | 65.5 | 65.5 | 65.5 | 65   | 73   | 74   | 69   | 65   | 75   | 72.5 | 64.5 | 64.5 | 65.5 | 71   | 65   | 65.5 | 67.9 |
| Bregma ...                    | 37   | 34   | 31.5 | 36.5 | 35   | 33   | 40.5 | 37   | 35.5 | 40.5 | 37.5 | 36.5 | 34.5 | 40.5 | 34.5 | 40.5 | 36.5 |
| $\frac{1}{3}$ ...             | 66.5 | 64   | 66.5 | 70   | 70   | 70.5 | 67   | 65   | 72.5 | 69   | 65   | 67   | 68   | 69   | 67   | 63   | 67.5 |
| Max. breadth...               | 56   | 52.5 | 50   | 52.5 | 48.5 | 53.5 | 57   | 59   | 58.5 | 61.5 | 49   | 55.5 | 52   | 57.5 | 46   | 48.5 | 53.6 |
|                               | 66.5 | 64   | 67   | 70   | 70.5 | 71   | 67   | 65.5 | 72.5 | 70   | 65   | 67.5 | 68.5 | 70   | 67   | 62   | 67.8 |
| $\frac{2}{3}$ ...             | 55   | 58   | 60.5 | 61.5 | 60.5 | 62   | 58.5 | 61.5 | 65   | 64.5 | 57   | 60   | 58.5 | 61   | 59   | 56   | 59.9 |
| $\frac{4}{5}$ ...             | 42.5 | 45   | 50   | 48   | 46   | 47.5 | 46.5 | 48   | 46   | 48.5 | 43   | 44.5 | 46.5 | 45   | 45.5 | 44.5 | 46.1 |
| Lambda ...                    | 90   | 88   | 85   | 91   | 88   | 88.5 | 94   | 89   | 86   | 90   | 84.5 | 87   | 87   | 92   | 87   | 86.5 | 88.3 |
|                               | 30   | 27   | 33.5 | 29.5 | 32   | 39.5 | 30   | 40.5 | 41.5 | 36.5 | 28.5 | 28.5 | 31   | 24.5 | 33.5 | 25   | 32   |
| Occipital pole...             | 95   | 91   | 90   | 95   | 92.5 | 96   | 97   | 97   | 95.5 | 96.5 | 89   | 91   | 90.5 | 95   | 92   | 89   | 93.3 |

TABLE A4.—Palatal Contour.

| No. of skull          | ... | 1                   | 2                   | 3                  | 4                    | 5                  | 6                    | 7                  | 8                 | 9                  | 10               | 11                | 12          | 13                | 14                 | 15                 | 16              | Av.                  |
|-----------------------|-----|---------------------|---------------------|--------------------|----------------------|--------------------|----------------------|--------------------|-------------------|--------------------|------------------|-------------------|-------------|-------------------|--------------------|--------------------|-----------------|----------------------|
| Canine...             | ... | 3.5<br>11.5<br>18.5 | 3.5<br>11.5<br>17.5 | 4.5<br>13<br>21.5  | 4<br>13.5<br>19.5    | 3.5<br>13<br>19.5  | 5<br>14.5<br>23      | 5<br>13<br>21      | 4.5<br>12.5<br>19 | 4.5<br>13<br>20    | 4<br>14<br>22.5  | 4.5<br>12.5<br>19 | —<br>—<br>— | 4<br>13.5<br>20   | 4<br>14<br>24.5    | 4.5<br>13<br>18.5  | 4<br>12<br>20   | 4.2<br>13.0<br>20.3  |
| 2nd premolar...       | ... | 7.5<br>18<br>26     | 9.5<br>15.5<br>23.5 | 9<br>18<br>28      | 10.5<br>17.5<br>27.5 | 8.5<br>18<br>25    | 11.5<br>19.5<br>28.5 | 10.5<br>22<br>29.5 | 11<br>17.5<br>25  | 9<br>21<br>29      | 10.5<br>19<br>29 | 9<br>17.5<br>25.5 | —<br>—<br>— | 9.5<br>17.5<br>26 | 8<br>21<br>29.5    | 9.5<br>17<br>25    | 9<br>20<br>26.5 | 9.5<br>18.6<br>26.9  |
| 2nd molar             | ... | 15.5<br>23<br>32    | 17.5<br>18<br>28.5  | 18.5<br>21.5<br>32 | 19<br>20<br>30.5     | 17.5<br>23<br>31.5 | 18.5<br>23<br>31     | 20<br>22<br>29.5   | 19<br>20<br>28    | 17.5<br>25<br>34.5 | 19<br>21.5<br>34 | 19<br>20.5<br>31  | —<br>—<br>— | 18.5<br>19<br>28  | 18.5<br>24<br>33.5 | 18<br>18.5<br>27.5 | 17<br>23<br>31  | 18.2<br>21.5<br>30.8 |
| Post. alveolar margin | ... | 24<br>28.5          | 25.5<br>24          | 26.5<br>26         | 27<br>26             | 25.5<br>29.5       | 27.5<br>27.5         | 28<br>23.5         | 27<br>23.5        | 30<br>30           | 29<br>27         | 28<br>27          | —<br>—      | 24.5<br>26        | 28.5<br>25.5       | 24<br>24           | 26<br>26.5      | 26.7<br>26.3         |
| Palatal spine         | ... | 28.5                | 27                  | 28                 | 28.5                 | 28                 | 30                   | 28                 | 28.5              | 33                 | 31               | 30                | —           | 26.5              | 29.5               | 25                 | 27.5            | 28.6                 |



TABLE B.

|                              | <i>Av. Eskimo.</i> <sup>1</sup> | <i>Av. Contour (16).</i> | <i>Chancelade Skull</i> |
|------------------------------|---------------------------------|--------------------------|-------------------------|
| Gl. Max. ... ..              | 185.0 (76)                      | 186.6                    | 193                     |
| Max. Br. ... ..              | 134.2 (74)                      | 135.6                    | 139                     |
| Aur. pt. ... ..              | 123.2 (30)                      | 125.0                    | 133                     |
| Bimax ... ..                 | 100.5 (31)                      | 100.0                    | —                       |
| Bizyg. ... ..                | 135.1 (55)                      | 135.8                    | 140                     |
| Ext. biorbital ... ..        | 105.5 (31)                      | 106                      | —                       |
| Min. fr. width ... ..        | 95.1 (31)                       | 96.4                     | 101                     |
| Nasi-alv. ... ..             | 72.4 (55)                       | 74.0                     | 77.0                    |
| Nasal pt. ... ..             | 51.9 (55)                       | 52.2                     | 61                      |
| Nasal width ... ..           | 22.5 (55)                       | 22.2                     | 26                      |
| Orb. pt. ... ..              | 35.5 (45)                       | 35.8                     | 32.5                    |
| Orb. width... ..             | 39 (33)                         | —                        | 38                      |
| Cran. capae. ... ..          | 1450 (56)                       | 1455                     | 1730                    |
| Cran. Ind. ... ..            | 72.5 (76)                       | 72.7                     | 72.02                   |
| Ht. length Ind. ... ..       | 66.6 (30)                       | 67.0                     | 68.9                    |
| Min. fr. br./Max. br. ... .. | 70.5 (31)                       | 70.2                     | 72.6                    |
| Pal. Ind. ... ..             | 79.3 (31)                       | 80.5                     | 67.9                    |
| Nas. Ind. ... ..             | 43.4 (55)                       | 42.5                     | 42.6                    |
| Orb. Ind. ... ..             | 89.9 (56)                       | —                        | 87.0                    |
| Hum. rad. Ind. ... ..        | 71.8                            | —                        | 83.0                    |
| Hum. fem. Ind. ... ..        | 77.7                            | —                        | 73.5                    |

<sup>1</sup> The figures in column 1 are obtained by reference to papers by Duckworth, Brinley, and Soren Hansen, and to the Catalogue of the Royal College of Surgeons.

## PAPUAN CAT'S CRADLES.

By D. JENNESS.

|  | CONTENTS. | PAGE. |
|--|-----------|-------|
| INTRODUCTION   | ...       | 300   |
| I. The Crab ( <i>Kau'ka</i> )                                  | ...       | 301   |
| FIGURES BEGINNING WITH OPENING A—                              |           |       |
| II. The Snake ( <i>Mo'ta</i> )                                 | ...       | 302   |
| III. The Two Parrots ( <i>Wiwi'a</i> )                         | ...       | 302   |
| IV. <i>Bololo'aku</i>  | ...       | 303   |
| V. The Basket ( <i>Fo'se</i> )                                 | ...       | 303   |
| VI. The Knee ( <i>Tu'ga lauma'ica</i> )                        | ...       | 304   |
| VII. The Baby ( <i>bebe'ta</i> )                               | ...       | 304   |
| VIII. The Yam ( <i>Muca'mo</i> )                               | ...       | 305   |
| IX. The Bald Man ( <i>De'ba</i> )                              | ...       | 305   |
| X. <i>Matafua'si</i>   | ...       | 306   |
| XI. <i>Na'ba</i>   | ...       | 306   |
| XII. The Sun and the Moon ( <i>Kauwa'na vai'koi</i> )          | ...       | 307   |
| XIII. A Ripe Chestnut ( <i>Gi'vi dibuli'na</i> )               | ...       | 308   |
| XIV. The Brush Turkey ( <i>Kwalau'ta</i> )                     | ...       | 308   |
| XV. The Seine ( <i>Guva'ta</i> )                               | ...       | 309   |
| XVI. The Pleiades ( <i>Yavunu'ga</i> )                         | ...       | 309   |
| XVII. The Pepper Plant ( <i>Laibi'ta</i> )                     | ...       | 310   |
| XVIII. The Banana ( <i>Bo'bi</i> )                             | ...       | 311   |
| XIX. <i>Wasifobo'di</i>  | ...       | 312   |
| FIGURES WITH OTHER OPENINGS—                                   |           |       |
| XX. The Crest of the Cockatoo ( <i>Wema'ta</i> )               | ...       | 312   |
| XXI. A Shell-fish ( <i>Matalaube'o</i> )                       | ...       | 313   |
| XXII. The Ear-Pendant ( <i>Ko'mako'ma</i> )                    | ...       | 313   |
| XXIII. <i>Sisiafua'tu</i>                                      | ...       | 314   |
| XXIV. } Cutting the Hand ( <i>Ni'ma dabada'bana</i> )          | ...       | 314   |
| XXIV A. }  |           |       |
| XXIV B. }  |           |       |
| XXV. The String Bag ( <i>Walia'va</i> )                        | ...       | 315   |
| XXVI. A Cereal resembling Sugar-cane ( <i>Tabuga'la</i> )      | ...       | 316   |
| XXVII. A Hiss (?) ( <i>Lausi'si</i> )                          | ...       | 316   |
| XXVIII. A Man crazed by Betel-nut ( <i>Kali'mu atuata'na</i> ) | ...       | 316   |
| XXIX. A Gathering-in (?) ( <i>Dodoki ukin</i> )                | ...       | 317   |
| XXX. The Kangaroo ( <i>Vagi'ta</i> )                           | ...       | 317   |
| XXXI. An Evil Spirit ( <i>Sila'u</i> )                         | ...       | 318   |
| XXXII. The Boar's Tusk Pendant ( <i>Matabi'li</i> )            | ...       | 318   |
| XXXIII. A Panpipe ( <i>Aiyuve'a</i> )                          | ...       | 319   |
| XXXIV. A House ( <i>Manu'a</i> )                               | ...       | 319   |
| XXXV. <i>Kiloma'dumadu</i>                                     | ...       | 320   |
| XXXVI. <i>Fakale'a</i>   | ...       | 320   |



|  | PAGE. |
|--|-------|
| XXXVII. A Canoe ( <i>Wa'ga</i> ) ... ..                  | 321   |
| XXXVIII. A Paddle ( <i>Voi</i> ) ... ..                  | 322   |
| XXXIX. A Squirrel ( <i>Selese'le</i> ) ... ..            | 322   |
| XL. A Bad Pot ( <i>Weleta'ka a'na yabelo'lo</i> ) ... .. | 323   |
| FIGURES REQUIRING TWO PLAYERS—                           |       |
| XLI. A Boat-sail ( <i>Nai'a</i> ) ... ..                 | 324   |
| XLII. The Sago Palm ( <i>La'bia</i> ) ... ..             | 324   |
| TRICKS—  |       |
| XLIII. A Mosquito ( <i>Nimo'ga</i> ) ... ..              | 325   |
| XLIV. A Certain Tree ( <i>Gi'mo</i> ) ... ..             | 325   |
| XLV. The Sago Palm ( <i>La'bia</i> ) ... ..              | 325   |
| XLVI. A Jumping Fish ( <i>So'uso</i> ) ... ..            | 326   |
| XLVII. <i>Tomobu'la</i> ... ..                           | 326   |
| XLVIII. A Parrot ( <i>Anega'la</i> ) ... ..              | 326   |

### INTRODUCTION.

THE Cat's Cradles that are described in the following pages were learned from the natives of Goodenough Island, D'Entrecasteaux Archipelago, Papua, in 1912. There were many other figures which I saw but did not record, so that altogether the number known to the natives in this region must be very considerable. In describing the movements, I have followed the terminology devised by Dr. A. C. Haddon and Dr. W. H. R. Rivers, and used in Miss Haddon's book, *Cat's Cradles in Many Lands*. The natives of Goodenough Island have special names for two movements that recur with great frequency in their figures: in the Bwaidogan dialect spoken in Mud Bay, they are called *nauwa* and *luatataga*. To *nauwa* is to take up with the thumb, from the proximal side, over any intermediate strings, the radial strings off the little fingers; to *luatataga* is to take up with the index fingers, from the proximal side, i.e., from above, the ulnar thumb strings. The *luatataga* frequently follows the *nauwa*.

I am indebted to the late Rev. A. Ballantyne, who was a missionary on Goodenough Island for many years, for the following information on the subject:—"The proper time for playing the game (Cat's Cradles) is at the *mwa'mo*<sup>1</sup> harvest. At all other times the old men prohibited them lest they should bring disaster on the gardens. As the *mwa'mo* harvest is immediately followed by the planting of yams, which are the principal food of the natives, it would seem that the playing of Cat's Cradles is beneficial for the yam gardens only.

"The native name for Cat's Cradles is *gi'wala*. This is also the name of a definite figure, which is supposed to have originated all the others. This figure, *gi'wala*, or *na'ba* as it is more usually called (see No. XI), is, or was until recently, performed at a very important ceremony in the social life of the community. When-

<sup>1</sup> The *mwa'mo* is a root similar to the yam.



ever the head man of a hamlet wanted a food-house constructed, certain men were detailed to build it and certain others to decorate it. The remainder, as soon as the hut was completed, gathered together, and performed this string figure *gi'wala*."

Some of the figures appear to be connected with magic. The natives use string bags (*walia'va*) to carry their vegetables home from the gardens. Whenever any of the vegetables in it were stolen they would employ a string figure, *walia'va* (No. XXV) to discover the thief. An incantation was first sung, then the figure was made. As the name of each suspected person was pronounced, the right hand was jerked downwards between the loops. If it passed through freely he was innocent, but if it stuck he was guilty. Another figure, *bu'ibui*, which I have not recorded, is performed only when the clouds seem to prophecy fine weather; the word itself means a certain type of cloud, the cumulus. Probably this figure also has a magical significance.

Certain figures, again, have a humorous significance. Thus *de'ba* (No. IX), from the word *debadeba'na*, meaning "he is bald," is intended to ridicule old men. An unrecorded figure, *balise'musemu*, similarly ridicules orphans. *Nimo'ga* (No. XLIII) is a humorous rendering of a person beating off a mosquito, and *kau'ka* (No. I) mocks a person whose fingers have been bitten by a crab.

Some figures are restricted in regard to their performers. Only married men and old men may make the figure *gi'mo* (No. XLIV). Girls who saw an unmarried youth making it would laugh at him and say, "Look! hasn't he a lot of children to fish for?" The *gi'mo* is a tree of which the fibres are used for making fish-nets. The figure *fakale'a* (No. XXXVI), again, may be performed by married people only.

Comparatively few figures appear to be accompanied by chants, although probably they exist in many cases where I have not recorded them. My teachers were mainly the children who lived around the mission station in Mud Bay; Cat's Cradles with them had become simply a pastime.

### 1. *The Crab (Kau'ka).*

Loop over the little fingers of each hand. With each thumb from the distal side take up both the little finger strings near their attachment to the opposite hand. With each thumb from the proximal side take up both the little finger strings of its hand, and with the middle fingers from the proximal side take up both the ulnar strings on the thumbs. Push the right hand outwards and the left inwards, turning the left palm upward. An outsider pinches together with thumb and finger the apices of the two triangles formed between the thumbs and middle fingers, one on each side. Release everything except the loops on the little fingers. The outsider's thumb and finger are caught, as though by a crab.



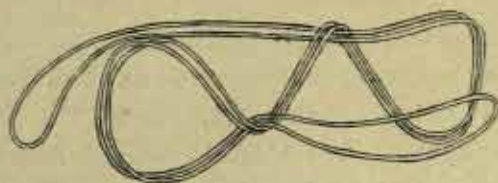


FIG. 1.—THE CRAB.

## II. *The Snake (Mo'ta).*

Opening A.<sup>1</sup> With the index fingers from the distal side take up the radial little finger strings and circle the indices into place again. Drop the little finger loops and circle the two loops on each index finger round and round in the same direction as before. When the strings are fairly taut, insert the remaining three fingers of each hand into the index loops and drop the thumb loops. Draw the two hands tightly apart and fling the loose string from the old thumb loops continuously over the other strings. A series of undulating strings is formed, *i.e.*, the snake.

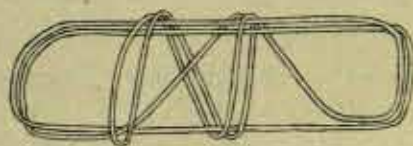


FIG. 2.

## III. *The Two Parrots (Wivi'a).*

Opening A. With the fingers pointing downwards, lay the whole figure carefully on the knees. Insert both hands through the near loop from above and turn them inwards so that the nearest string (the old ulnar little finger string) forms a loop on the wrists. Then from the far, or distal, side take up the outermost string (formerly the radial thumb string) with the little fingers. You have now on each hand an ulnar little finger string and an ulnar wrist string passing over and dragging down a palmar string. With the back of the index fingers (*i.e.*, from below) take up the opposite palmar strings and remove the loops on the wrists to the thumbs. With the thumbs over the other strings take up from the proximal side the radial little finger strings. Remove the loops from the index fingers; then with the index fingers from the proximal side take up the ulnar thumb strings. Turn the palms outwards and draw the hands apart. Loops appear on either side facing each other—the male and the female parrot.

<sup>1</sup> In making Opening A, take up the left palmar string with the index finger of the right hand, then the right palmar string with the index of the left.

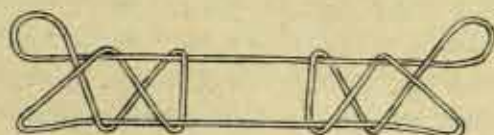


FIG. 3.

IV. *Bololo'aku.*

Opening A. Drop the loop on the left index and transfer the right index loop to the left hand.<sup>1</sup> With the right thumb from the proximal side take up the right-hand radial little finger string, and with the right index from the proximal side take up the ulnar thumb string. With the thumb and index of the left hand hold up the two loops on the right thumb, and, releasing the right hand, insert the right thumb through the former little finger loop from the opposite side to that in which the little finger passed through it, and the little finger through the former index loop (from the same side as the index passed originally). Repeat this movement twice, then again take up the right radial little finger string with the right thumb and the ulnar thumb string with the index. Knotting strings appear in the middle, succeeded towards the right by three diamonds. Drop the right thumb ulnar string from the index finger and take it up again. As this is continued the loop travels over to the left hand, followed by the three diamonds, and the operator chants "*Bololo'aku diekwa'ku da vene'venega'ku.*" Finally the loop reaches the left hand. Now remove the loop on the left index finger and continue the movement with the right hand. The loop disappears, but the diamonds travel back to the right, and as they travel the operator chants "*U munu'ku u munu'ku.*" "You are smiting me."

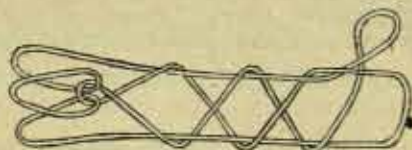


FIG. 4.

V. *The Basket (Fo'se).*

Opening A. With the index fingers from the distal side take up the radial little finger strings, allowing the little finger loops to drop as the index fingers circle back into position. Insert the other three fingers of each hand into the index loops

<sup>1</sup> In this case take up the right palmar string with the index finger of the left hand, then the left palmar string with the index of the right.



from the distal side and draw down its two ulnar strings. Carefully drop the loops on the thumbs, and, from between the ulnar and radial strings thus dropped, take up with the thumbs from the proximal side (*i.e.*, from below) the proximal radial index string that runs diagonally to the bottom string. Insert the middle fingers from the proximal side under the distal radial index strings so as to open out the figure. A basket appears, the lower transverse strings running side by side, forming the bottom. An onlooker says, "*Kali'mu ta'mo u na vele'ku*," "Give me a betelnut"; but the operator pushes his elbows into his sides, causing the two bottom strings to rise up to the top of the basket, and says "*Ke'ke, fo'se ga'gana*," "No, the basket is empty."

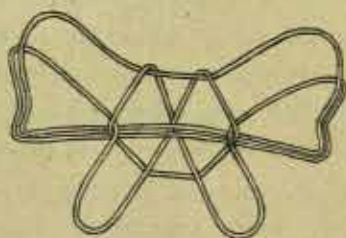


FIG. 5.

#### VI. *The Knee (Tu'ga laruma'wa).*

Opening A. Push the knee through the index loops and drop the index loops; the knee is caught. Pass the index fingers over both the little finger strings and take up the ulnar thumb string from the distal side and return. Drop the thumb loops and remove the index loops to the thumbs. With the backs of the index fingers (*i.e.*, from below) take up the knee strings and drop the knee. With the thumbs over the index strings take up the radial little finger strings from the proximal side and with the index fingers from the proximal side take up the ulnar thumb strings. Drop all the index strings and with the indices from the proximal side take up the ulnar thumb strings. Turn the palms out. You have the figure.



FIG. 6.

#### VII. *The Baby (Bebe'ta).*

Opening A. Push the right elbow through the strings above the lower transverse string. Turning the left thumb down, take up with it from the proximal side the

left ulnar little finger string, and draw it through, allowing the original thumb loop to slip off. Drop the loops on the right index and on the left little finger. Push the radial left index string to the end of the finger and draw down its ulnar string with the other three fingers of the left hand. With the right index from the proximal side take up the ulnar thumb string. The baby appears in the middle.

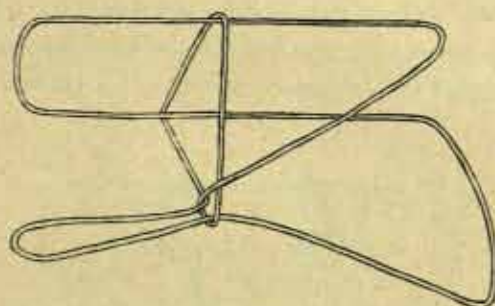


FIG. 7.

#### VIII. *The Yam (Mwa'mo).*<sup>1</sup>

Opening A. Drop the thumb loops and lay the rest with the fingers pointing down on the knees. Insert the hand through the near triangle from above, taking up the near strand (the old lower transverse string) so that it lies on the wrists. Then with the little fingers from the far side take up the far strings (the old upper transverse string). Remove the wrist loops to the thumbs. With the thumbs take up the radial little finger strings from the proximal side, and with the index fingers from the proximal side take up the ulnar thumb strings. Turn the palms outward and see-saw the figure until four diamonds open out.

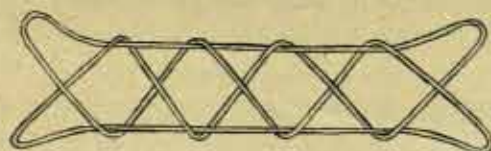


FIG. 8.

#### IX. *The Bald Man (De'ba).*

Opening A. With the fingers pointing downwards lay the figure carefully on the knees. Insert the hands from above behind (*i.e.*, on the far side of) the nearer pair of crossing strings and twist them round on to the wrists. Then with the little fingers take up the far string from the far side. Remove completely the two loops from each wrist and place them on the thumbs. With the thumbs from the proximal side take up the radial little finger strings, and with the indices from the proximal

<sup>1</sup> This figure can be produced in a variety of ways, some of which are given later (see Nos. XVIII, XXVI, XXVIII); Miss Haddon has it as "The Calibash Net" from East Africa (*Cat's Cradles in Many Lands*, p. 37).



side take up both the ulnar thumb strings. Turn the palms outwards. Remove the long pendent radial string to the other side of the thumbs so that it crosses from between the thumb and index of each hand. Over this string with the thumbs from the proximal side take up both the ulnar index strings. Remove the loops from the indices, then with the thumbs from the proximal side take up the radial little finger strings, and with the indices from the proximal side both the ulnar thumb strings, and turn the palms outwards. You have two diamonds at the bottom of a large U. This is the bald man.

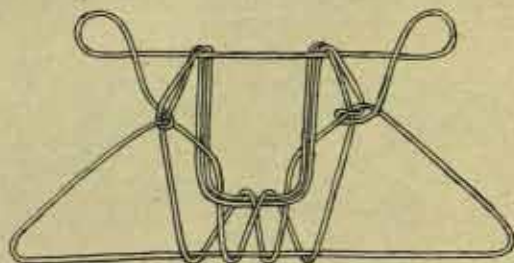


FIG. 9.

#### X. *Matafwa'si.*

Opening A. Drop the thumb loops and over the other strings take up in the mouth the ulnar little finger string. Take up each string running from the little finger to the mouth from the proximal side with the index finger of the opposite hand and drop the loop in the mouth. With the thumbs over the proximal radial index strings take up the two ulnar strings of the index fingers from the proximal side. With the middle fingers over the distal radial index strings take up from the proximal side the proximal radial index strings. Drop both the loops on the thumbs, and over both the ulnar strings of the indices (i.e., the two strings just dropped from the thumbs) take up with the thumbs from the proximal side the distal radial index strings (the palmar middle finger strings). Pull down the ulnar middle finger strings with the ring and little fingers inserted from the distal side. Two diamonds appear in the middle.

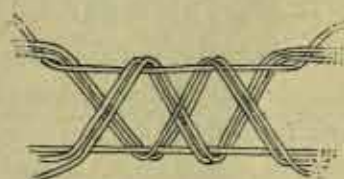


FIG. 10.

#### XI. *Number (?) (Na'ba).*

The opening is the same as for the last figure, *Matafwa'si*. There are two loops on each index finger and one on each little finger. Take up with the thumbs,

without passing over the other strings, the radial little finger strings from the proximal side, and then, also from the proximal side, the distal radial index strings. Navaho the thumbs and release the distal loops of the index fingers. With the index fingers from the proximal side take off the thumb loops. Again with the thumbs from the proximal side take up the radial little finger strings and the distal radial index strings. Navaho the thumbs. Pass the middle fingers over the distal ulnar index strings and take up with them from the proximal side the proximal radial index strings. Drop the little finger loops and turn the palms outwards. A number of diamonds appear.

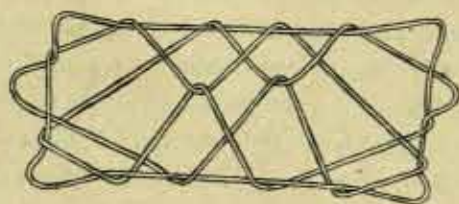


FIG. 11.

## XII. *The Sun and the Moon (Kauwa'na vai'koi).*<sup>1</sup>

Opening A. Push the hands through the index loops from the proximal side. With the little fingers over the ulnar thumb strings take up the radial thumb strings from the proximal side, then with the index fingers from the distal side take up the radial little finger strings. Turn the palms upwards. With the thumb and index finger of the right hand take up the radial thumb and the radial index strings of the left hand where they meet on the palm of the ring finger, and release all the left hand except the wrist loop. Two loops now hang down. In the first—the old left thumb loop—insert from the proximal side the little finger of the left hand; in the second—the old left index loop—insert over the new little finger-loop the left thumb from the distal side. Do the same with the right hand. Repeat this operation, with the little fingers taking up the radial thumb strings, and the index fingers the radial little finger strings, and turn the palms upward. Now remove the radial string of the left wrist and place it between the left thumb and the left index finger. Take hold with the right thumb and index of the three strings that meet on the left palm, i.e., the radial thumb, the old radial wrist and the radial index strings. Release all the left hand. Through the old thumb loop insert the left little finger; through both this loop and the old index loop insert the left thumb, both from the proximal side, the remaining string falling free on the palmar side of the left hand. Do the same with the right hand; then with the index fingers from the proximal

<sup>1</sup> This figure is also called *Ni'la dibuli'na*, a ripe coco-nut.



side take up the ulnar thumb strings and turn the palms outward. Two diamonds appear in the middle, one the sun and the other the moon.

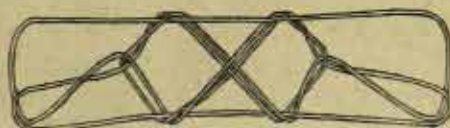


FIG. 12.

### XIII. *A Ripe Chestnut (Gi'vi dibuli'na).*

This is the same as the last figure ("The Sun and the Moon") except that (first) you take up the ulnar thumb string instead of the radial thumb string with the little finger; and (second) the whole movement is repeated four times and then the wrist string removed. When the movement is complete you have a series of eyelets, but towards each side are two interlacing strings. These are the chestnuts. Carefully lay the figure on the knees, release all but the little fingers, and insert the thumbs under these interlacing strings from the proximal side. Draw the strings taut, and in so doing take up the ulnar thumb strings from the proximal side with the index fingers. Loops appear, as in Fig. 3 ("The Two Parrots"), on either side—the chestnuts have fallen.

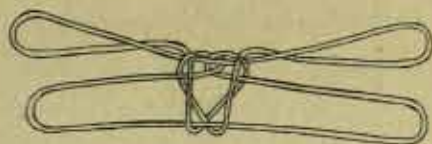


FIG. 13.

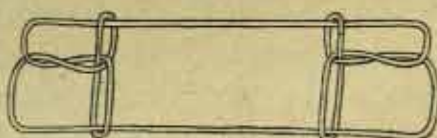


FIG. 14.

### XIV. *The Brush Turkey (Kwalau'ta).*

Opening A. Push the hands through the thumb loops from the distal side. With the thumbs over both wrist strings take up the ulnar little finger strings from the distal side. Remove the loops from the little fingers. Pass the little fingers over the other strings and take up the ulnar thumb strings from the proximal side. Push the index loops through each other and place them on the opposite indices. Through the middle of the left index loop take up the ulnar thumb and radial little finger strings with the thumb and index of the right hand, release the whole of the left hand except the wrist loop, and place the thumb and the little finger back into their old loops. Do the same with the right hand. Clap the hands together, cry *br-r-r-r* to imitate the flight of the bird, drop the little finger loops and draw the hands apart, the index fingers at the same time taking up the ulnar thumb strings from the proximal side. According to which index loop is passed through the other, you have one brush turkey in the middle, or two, a male and a female, one on each side.

XV. *The Seine (Guva'ta).*<sup>1</sup>

Opening A. With the thumbs over the other strings take up the radial little finger strings from the proximal side, and with the index fingers from the same side take up the ulnar thumb strings. Release all the thumb loops and transfer the distal index loops to the thumbs. With the little fingers over the other strings take up the ulnar thumb strings from the proximal side, and with the index fingers take up the radial little finger strings, also from the proximal side. Drop all the little finger loops and transfer the distal index loops to the little fingers. Push the whole hand through the thumb loops from the proximal side. With the thumb and index of the right hand take hold of the ulnar index string and the radial little finger string on the palm of the left hand. Carefully release the left hand altogether. Through the old wrist loop insert the thumb from the opposite side to that in which the hand passed through, and reinsert the index and the little fingers in their original loops. Do the same with the right hand. With the thumbs over the other strings take up the radial little finger strings from the proximal side, and with the index fingers from the proximal side take up the ulnar thumb strings. Remove all the index loops. Then again from the proximal side take up with the index fingers the ulnar

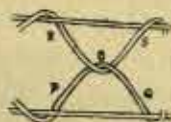


FIG. 15.

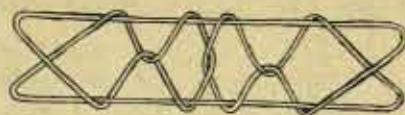


FIG. 16.

thumb strings and turn the palms outward. Drop the index loop and carefully repeat the movement. A series of diamonds is formed as in Fig. 8 ("The Yam"). This is the net. Presently it breaks in the middle—the net is bad, and the fish escape. It is necessary to repair the net. On each side you have interlacing strings, as in Fig. 15. Lay the figure carefully on the knees, the fingers pointing downwards in so doing. Place the right thumb under P, the right little finger under Q, and the right index between the strings at O. Similarly place the left thumb under R, the left little finger under S, and the left index through O. Draw the hands apart and repeat the whole process from the beginning. This time the net does not break.

XVI. *The Pleiades (Yavunu'ga).*

Opening A. With the thumbs over the index strings take up from the proximal side the radial little finger strings, and with the index fingers from the proximal side

<sup>1</sup> At Wedau, on the mainland of Papua, opposite Goodenough Island, this figure is called "The Dog."



take up the ulnar thumb strings. Release the loops on the thumbs. With the thumbs over the proximal radial index strings take up from the proximal side the ulnar little finger strings. Release the little finger loops. With the little fingers over the distal ulnar index strings take up the proximal radial thumb strings. Release the loops on the thumbs. With the thumbs over the proximal radial index strings take up from the proximal side the two ulnar index strings. Navaho the thumbs and release the distal radial index strings. With the thumbs over the index strings take up the radial little finger strings from the proximal side, and with the index fingers from the proximal side take up the ulnar thumb strings. Carefully release the thumbs and insert them from the proximal side under the old distal radial thumb strings and the distal ulnar index strings which cross the upper transverse string. Remove the distal loops of the index fingers. With the index fingers from the proximal side take up the ulnar thumb strings. Drop all the thumb loops. With the thumbs over the proximal radial index strings take up from the proximal side the ulnar little finger strings. Release the little finger loops. With the little fingers over the distal ulnar index strings take up the proximal radial thumb strings. Release the loops on the thumbs. With the thumbs over the proximal radial index strings take up from the proximal side the two ulnar index strings. Navaho the thumbs and release the distal radial index strings. With the thumbs over the index strings take up the radial little finger strings from the proximal side, and with the index fingers from the proximal side take up the ulnar thumb strings. This gives you the Pleiades.<sup>1</sup>

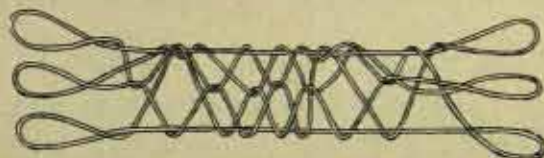


FIG. 17.—THE PLEIADES.

#### XVII. *The Pepper Plant (Laibi'ta).*

Opening A. With the index fingers from the distal side take up the radial little finger strings. Drop the loops on the little fingers, insert the other three fingers of each hand into the index loops from the distal side, and pull down the two ulnar index strings. A cross appears in the middle. Drop the loops on the thumbs, and from between them take up from below (*i.e.*, from the proximal side) the proximal radial index strings with the thumbs. Take up in the mouth the intersecting diagonal strings. Release the three fingers (if retained) which were pulling down the ulnar

<sup>1</sup> There is a method of unravelling this figure step by step, each reducing the number of diamonds. Unfortunately, it was never recorded. The same figure is known at Kiriwina, in the Trobriand Archipelago.



index strings and remove the distal index loops to the little fingers ; then release all the index and thumb loops. Remove the little finger loops to the thumbs, straightening them out. With the little fingers from the proximal side take up the ulnar strings, and with the index fingers take up the opposite palmar strings as in Opening A. With the thumbs over the index strings take up the radial little finger strings from the proximal side, and with the index fingers from the proximal side take up the ulnar thumb strings. Navaho the thumbs. Drop the little finger loops and from the proximal side take up the proximal radial index strings with the little fingers. Drop the index loops, and from the proximal side take up with each index finger the string which hangs on its side perpendicularly from the mouth. Release the strings from the mouth. You have the pepper plant.

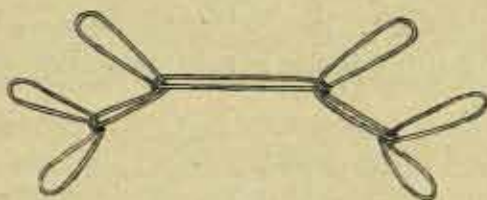


FIG. 18.—THE PEPPER PLANT.

#### XVIII. *The Banana (Bo'bi).*

Opening A. With the indices over the little finger loops take up the ulnar thumb strings from the distal side. Drop the thumb loops. Circle the indices clockwise so that they take up the radial little finger strings from the distal side. Insert the thumbs under both radial index strings from the proximal side and drop the little finger loops. Two strings, one on each side, run between the upper and lower transverse strings on their distal side. Take up each of these strings with the nearer little finger from the proximal side, and release all the index loops. Strain the ulnar little finger strings down with the wrists, and rest the figure, palms downward, on the knees. Two crossing diagonals appear in the middle. Take up the upper half of each diagonal from the proximal side with the nearer index finger. Release the distal radial thumb strings (i.e., the loop, the ulnar string of which runs to the index finger). With the thumbs over the index strings take up the radial little finger strings from the proximal side, and with the index fingers from the proximal side take up the ulnar thumb strings. Turn the palms outward, then release all the index loops. Again with the index fingers from the proximal side take up the ulnar index strings and turn the palms outward. Two strings run between the upper and lower transverse strings on the proximal side of all the rest. Take these up in the mouth. Drop the loops on the thumbs and little fingers, and remove the index loops to the little fingers. Two strings fall perpendicularly side by side from the mouth. Take each up from the face side with the nearer thumb and



release them from the mouth. With the thumbs from the proximal side take up the radial little finger strings, and with the index fingers from the same side take up the ulnar thumb strings. Four diamonds appear, as in Fig. 8 ("The Yam").

#### XIX. *Wasifobo'di*.<sup>1</sup>

Opening A. Release the right index (or the left, as may be required) so that the left palmar string passes above both the left index strings. Transfer the left index loop to the right index. Place the left thumb loop on the big toe of the right foot and the left little finger loop on the little toe of the same foot. Between the strings of the right index loop draw through the ulnar thumb and the radial little finger strings. Hold these two in the right hand and take hold of them on their distal sides with the left hand. Pull the left hand upwards and a triangle opens out, the two right-hand strings issuing from its apex. Pull the right hand upwards and the triangle closes.



FIG. 19.

#### FIGURES BEGINNING WITH OTHER OPENINGS.

#### XX. *The Crest of the Cockatoo (Wema'la)*.

Hold the string between the index and middle fingers of the right hand so that a loop about an inch and a half long is left standing up on the back of the hand. Wind the two long pendent strings round the palmar side of the index finger across the back of the hand, passing on the distal side of the upturned loop, round the little finger, and up between the little and the ring fingers, back over the hand on the distal side of the upstanding loop. Hold it with the thumb against the side of the index finger, and push the upstanding loop over the two double strings down between the index and the middle fingers so that it projects on the palmar side. Remove the double loop on the little finger, and make it stand up on the back of the hand like the

<sup>1</sup> This is the same as a figure known to the Eskimo of Northern Alaska and of the Mackenzie River delta as "The Boiling Pot."

first loop. Repeat the operation from the beginning, and continue until all the string is used up. Finally you have a row of down-pointing palmar loops, and a single double-stringed loop upstanding on the back of the hand—the crest of the cockatoo.

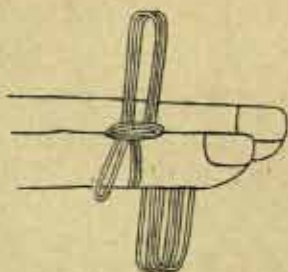


FIG. 20.

### XXI. *A Shell-fish (Matalaube'o).*

Take a loop about five or six inches long and insert the left thumb and the left index finger through it. From below the palmar thumb-index string draw through the dorsal thumb-index string with the right index inserted from above. With the left index finger over the lower transverse string take up from below (*i.e.*, with the back of the finger) the upper transverse string. Circle the left index round all its strings once clockwise, then place the right index string on the left thumb, and you have the figure.

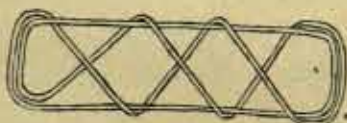


FIG. 21.

### XXII. *The Ear-Pendant (Ko'mako'ma).*<sup>1</sup>

Make a small circle in the cord. Hold it up in the left hand, and with the right thumb and index finger draw through the string leading to the right, so as to make

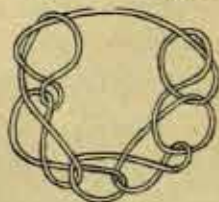


FIG. 22.

a second small circle like the first. Repeat this continuously until only about one inch of string remains between the first and the last circle. Hold the figure up by this free end. You have a very accurate representation of the ear-pendant with

<sup>1</sup> This figure resembles the European chain loop.



red shell beads round the rim. Insert the right hand through the middle and sweep it along to the right; all the circles disappear.

### XXIII. *Sisiafwa'tu*.<sup>1</sup>

Loop over the little finger of each hand and, holding the strings taut with each thumb from the proximal side, take up both the transverse strings. Pass the left index from the distal side under the two right palmar strings and turn it, first inwards, then outwards again. Do the same with the right index, taking up the palmar strings between the left index and the thumb. Draw the hands apart. From the proximal side take up with the thumbs both the radial index strings. Navaho the thumbs, then drop all the loops on the left index and the right thumb. A knot forms in the middle. Drop the loops on the right index and the left thumb and the knot resolves.

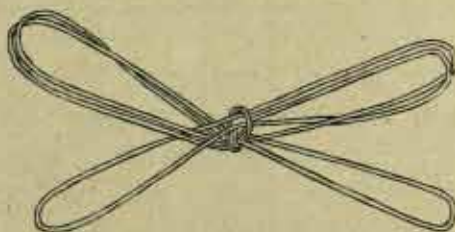


FIG. 23.

### XXIV. *Cutting the Hand* (*Ni'ma dabada'bana*).

Loop over the left thumb and the left little finger as in Position I. Pass the right hand through the other end of the loop, and draw the palmar string through. Repeat this, then loop the string over the right thumb and little finger similarly to the left hand. With the back of the right index take up from the proximal side the left palmar string and return. With the left thumb from the proximal side take up the radial little finger string of the left hand; with the right thumb similarly

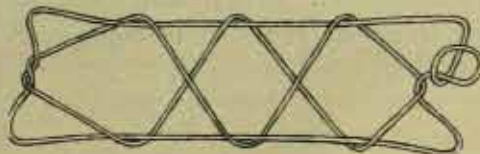


FIG. 24.

take up the ulnar index string of the right hand over the radial string. Take up with the left index from the proximal side the ulnar thumb string, and with the right index from the proximal side the radial index string. Navaho the thumbs, then drop the loops on the little fingers and turn the palms out. Three diamonds appear in the string.

<sup>1</sup> This figure is called in Kiriwina *Dauwi'ku*. It is very similar to "The Locust" of Uganda (see Miss Haddon, *loc. cit.*, p. 28).

Let an onlooker insert his hand through the middle diamond. Sway the hands from side to side chanting, "*Ni'ma dabada'ba bi'bia'vo ni'madi ka na da'badaba ka na daba'goloi*," literally, "Hands cut, children their hands we will cut we will cut entirely." Release all the strings of the left hand and pull with the right; the onlooker's hand is released.

#### XXIVA. (Second method.)

Opening A, except that the right-hand loop at starting is given one complete revolution clockwise. Release the loops on the little fingers. The onlooker inserts his hand from beneath through the diamond in the middle. Release the loops on the index fingers, and the wrist is caught. Take up the ulnar strings of the thumbs with the little fingers from the proximal side and make Opening A above the imprisoned wrist. Now pass the imprisoned hand through the new figure between the index loops. Release the loops on the little fingers and the wrist is freed.

#### XXIVB. (Third method.)

Opening A, except that the right-hand loop at starting is given one complete revolution clockwise. The onlooker inserts his hand through the middle of the transverse strings so that the radial thumb and the ulnar little finger strings are on one side of the wrist, the rest on the other. Let go the little finger loops and the wrist is caught. Let go the index loops and the wrist is free again.

#### XXV. *The String Bag (Walia'va).*

Double the string and make Position I with the left hand. Insert the right hand from below through the other end of the two loops, and draw through the two left palmar strings. Again insert the wrist through, and with the right thumb and index finger draw half-through the two ulnar strings of the thumb and the

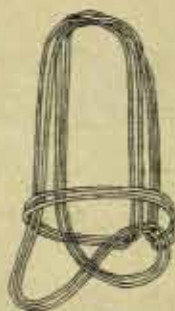


FIG. 25.

two radial strings of the little finger. Release all the left hand and hold the figure up with the right hand, gripping the four loops just drawn half-through. The pendent strings are held together by a circular loop of two strings. Insert the left hand between the strings just below the right hand and jerk it down. The circular loops slip over, and the hand should pass through freely.



XXVI. *A Cereal resembling Sugar-cane (Tabuga'la).*

Make a small circle and hold it in the mouth. Place the other end of the long loop on the head. Pass the hands, with fingers pointing towards the face (*i.e.*, from the outside) through the long side loops, and bend them outwards round them, so that a loop lies on each wrist. Then pass the little fingers below all the strings, and from the inside insert them through the small circle held in the mouth. Drop the loops from the mouth and head, and remove the wrist loops to the thumbs. With the thumbs from the proximal side take up the radial little finger strings, and with the index fingers from the proximal side take up the ulnar thumb strings. Turn the palms outward and you have the same four diamonds as in Fig. 8 ("The Yam").

XXVII. *A Hiss (?) (Lausi'si).*

Position I. Loop the radial string of the left thumb round that thumb. With the back of the right index take up this new loop on its palmar side, then with the back of the left index take up the right-hand palmar cord between the two index strings, and with the right index do the same with the left palmar cord. Drop all the left-hand strings. Raise the distal loop on the right index and push the proximal loop through it. Then from the back of the hand (*i.e.*, from the proximal side) with the back of the left thumb take up this new distal index loop, and with the back of the little finger (*i.e.*, from the distal side) take up the new proximal index loop. Draw the hands apart, and reverse the loops on the thumbs inwards by taking hold of the ulnar strings. With the thumbs from the proximal side take up the radial little finger strings, and with the index fingers from the proximal sides take up the ulnar thumb strings. Turn the palms outward. A cross appears in the middle.

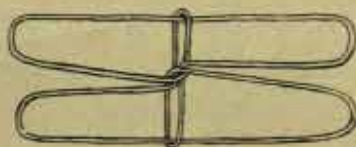


FIG. 26.—A HISS (?)

XXVIII. *A Man crazed by Betel-nut (Kali'mu atu'atua'na).*

Make a small circle in the string, insert the index fingers into it from the far side (*i.e.*, distal), and draw the hands apart. You have then two loops on the index fingers, the ulnar strings crossing one another. With the thumbs over the radial index strings take up the corresponding ulnar strings in turn, and with the little fingers over the distal radial index strings, take up the proximal radial index strings from the proximal side. With the index fingers from the distal side take up the



distal radial index strings after they pass under the strings running from the indices to the little fingers. Turn the hands out.<sup>1</sup> Drop the two radial strings on the thumbs \*, and take them up again as they pass between the ulnar index string and the ulnar little finger string. Remove all the loops on the index fingers §. Invert the thumb loops twice, turning them inwards. With the index fingers take up the ulnar thumb strings from the proximal side, and turn the palms outward. See-saw the figure until you have four diamonds, as in Fig. 8 ("The Yam"). An onlooker inserts his hand through the first diamond and out through the fourth. Drop the index strings. The onlooker's hand is released and the figure is resolved, leaving a knot in the middle.

### XXIX. *A Gathering-in (?) (Dodoki'ukiu).*

The movements are the same as in No. XXVIII ("A Man crazed by Betel-nut") up to the point marked \*, except that in the opening stage, when there are two loops on the index fingers, the right index is circled once clockwise. Circle the left hand under so that the little finger is nearest the body and the index finger points upward. Extend the right hand, bobbing the right index up and down towards the onlooker. You have the figure *Dodoki'ukiu*.

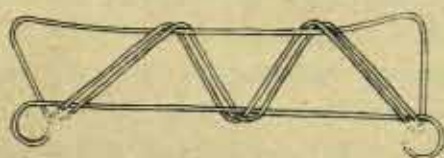


FIG. 27.—A GATHERING-IN (?).

### XXX. *The Kangaroo (Vagi'ta).*<sup>2</sup>

This is the same as No. XXVIII ("A Man crazed by Betel-nut") down to the point marked § in that figure. With the index fingers from the proximal side take up the ulnar thumb strings. Drop the thumb loops, and from the distal side take up with the thumbs the ulnar little finger strings. Remove the loops from the little fingers. With the little fingers over the index loops take up the ulnar thumb strings from the proximal side. Push the index loops through each other and place them on the opposite index fingers. Between the radial and the ulnar left index strings take up the ulnar thumb and the radial little finger strings; release the left hand, and from the side place these loops in the mouth. Similarly take up the ulnar thumb and the radial little finger strings of the right hand, and from the side insert a hand through each loop thus held up—the right hand through the old right thumb loop, the left hand through the old right little finger loop. Take up with

<sup>1</sup> This gives "The Little Fishes" of Murray Island (see Miss Haddon, *loc. cit.*, p. 13).

<sup>2</sup> This figure is doubtfully correct.



the little fingers the loops in the mouth, the left little finger the left loop, the right the right loop, holding the fingers pointed inwards towards the mouth. Drop the mouth strings and draw the hands apart. You have two kangaroos, one on each side.

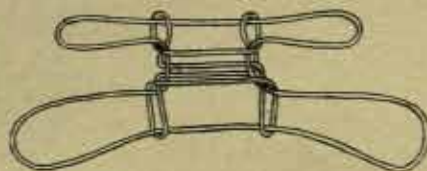


FIG. 28.—THE KANGAROO.

### XXXI. *Silau, an Evil Spirit (Sila'u).*

This is the same as No. XXVIII ("A Man crazed by Betel-nut") down to the point marked §, except that the last step is not carried out, *i.e.*, the index loops are not removed. Instead, push the most distal (*i.e.*, outermost) index loops through each other, and place them on the opposite index fingers. Release all the thumb loops, then remove the proximal (*i.e.*, innermost) loops on the index fingers, and pull tight the string running across the palm to the little finger so that the released index loop makes a knot. Remove the figure from the hands altogether, holding it up by the palmar strings. *Silau* appears with her ears pricked up; her legs at the bottom can be separated, forming a circle.

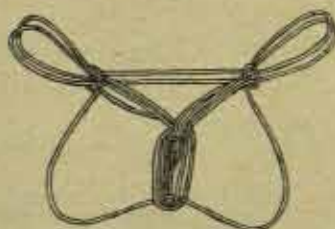


FIG. 29.—AN EVIL SPIRIT.

### XXXII. *The Boar's Tusk Pendant (Matabi'li).*

Place the loop over the head and let it hang around the neck. With the pendent-string in front make Position I with the right hand and place the palmar string in the mouth. With the thumb from the proximal side take up the radial little finger string, and with the index from the proximal side take up the ulnar thumb string. Turn the palm inward, and with the left thumb and index hold up the two strings that pass together between the right thumb and the index finger. Release the right hand. Two loops now hang down. Insert the right hand between them on the distal side and place the thumb through one loop (formerly the little finger loop) and the little finger through the other (formerly the thumb loop). Repeat this

movement four times, then release the string in the mouth. A series of diamonds is formed on the chest—the boar's tusk pendant.

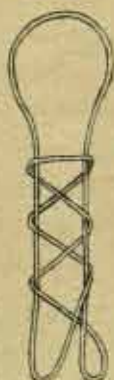


FIG. 30.—THE BOAR'S TUSK PENDANT.

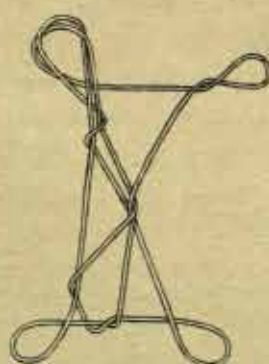


FIG. 31.—A PANPIPE.

### XXXIII. *A Panpipe (Aiyue'a).*

Position I. With the right index take up the palmar cord with its palmar aspect (*i.e.*, from above) and return, circling it clockwise. With the left thumb from the proximal side take up the radial little finger string, and with the left middle finger the ulnar thumb string. With the right thumb from the proximal side take up the radial index string. Navaho the left thumb and drop the loops on the little fingers. Turn the palms out and circle the left hand so that its palm is against the chest, while the right hand is stretched out with its palm outward. You have the panpipe. An onlooker blows along the strings, and as he does so the operator pinches his under lip with the thumb and index of the right hand.

### XXXIV. *A House (Manu'a).*

Lay a short length of string over the thumbs. Pass each index under the transverse string, pointing them outward. With the palm of the left index, draw down and out the string passing between the right thumb and index. Circle the indices clockwise, drawing the hands apart and dropping the loops on the thumbs. There are now two loops on each index, the ulnar strings of the one hand crossing each other, and likewise the distal strings of the other hand. Take up with the thumbs from the proximal side, over the radial index strings in turn, the corresponding ulnar strings, and with the little fingers over the distal radial index strings take up from the proximal side the proximal radial index strings. With each index finger from the distal side take up its distal radial index string after it passes under the string running between the index and the little finger. Turn the palms out, and throw the long pendent thumb string over to the other side of the figure. Lay the middle of the figure carefully on the knees, and, dropping the loops on the thumbs, take up with them from the proximal side the loose string just flung over where it lies



between the upper and lower strings that cross between the hands. This gives you the house, the transverse thumb string forming the ridge-pole.

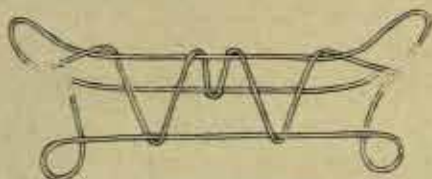


FIG. 32.—A HOUSE.

XXXV. *Kiloma'dumadu.*

Commence as in No. XXXIV ("The House"), but instead of circling the left index, insert the left thumb under the string running through the palm of the left hand. There are then two loops on the right index, one on the left index, and one on the left thumb. With the right little finger over the proximal ulnar index string take up from the proximal side the proximal radial index string. With the left middle finger over the ulnar index string take up the ulnar thumb string from the proximal side. Transfer the distal right index loop to the right thumb, and release the left index loop. With the right index from the distal side take up the ulnar right index string, and with the left index from the distal side take up the string running down to the ulnar left middle finger string. Turn the palms out and you have the figure *Kiloma'dumadu*.

Release the right thumb loop and draw away the right hand. The winding strings pull over to the left.

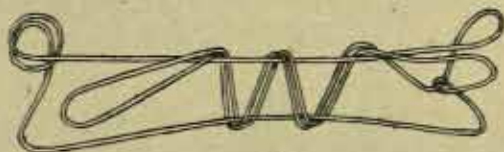


FIG. 33.

XXXVI. *Fakale'a.*

The opening is the same as in No. XXXIV ("The House"). There are two loops on each index. With the thumbs over each radial string in turn, take up the corresponding ulnar string from the proximal side, and with the little fingers over the distal radial index strings take up the proximal strings from the proximal side. With the index fingers from the distal side take up the distal radial index strings just before they pass under the lower transverse string. Drop both the radial thumb strings, and over the loose pendent string take up again the radial thumb string before it crosses the ulnar index string above. Remove this index loop. With the indices from the proximal side take up the ulnar index string that crosses between the upper and lower transverse strings (i.e., the middle transverse string). Drop the thumb loops, and from the proximal side take up with the thumbs

the ulnar index string which crosses the lower transverse string, then also the upper transverse string. Drop the distal index loop \*. With the indices from the proximal side take up the strings which run from the indices to cross the distal radial thumb strings. Drop the little finger loops, and with the little fingers take off from the proximal side the distal index loops that run transversely from one hand to the other. Again with the indices from the proximal side take up the proximal radial index strings. Drop the distal radial thumb loops, and take up with the thumbs from the proximal side the distal ulnar index strings (*i.e.*, the upper transverse string) and remove these loops from the indices. Repeat from \*. Finally, with the indices from the proximal side take up the index strings which cross the radial thumb strings. Release the distal radial thumb strings and jerk the thumbs up. Fakalea stands up. Turn the palms down and he sits down again.

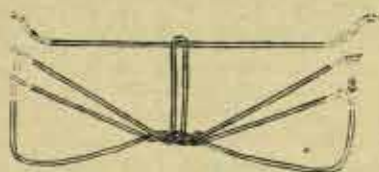


FIG. 34.

XXXVII. *A Canoe (Wa'ga).*

Point the index fingers first upward, then inward, and, taking up with them the ulnar thumb strings, point them outward again; now turn them downward and inward, and take up the cross strings which form the radial thumb and palm strings. Separate the hands, dropping the palmar strings. The position now is three loops on each index; the radial, distal, and middle strings cross each other, but the proximal strings run straight from one hand to the other; of the ulnar strings the proximal and middle strings cross, but not the ulnar distal. With the thumbs over each radial string in turn, take up the corresponding ulnar string from the proximal side, and with the little fingers over both the distal and middle radial index strings, take up from the proximal side the proximal radial string. With the index fingers from the distal side take up the two radial index strings that cross the palms of the little fingers. Turn the palms of the hands out, drop the thumb loops, and spread the figure out. The long pendent string is hoisted on a stick which rests on the bottom transverse string. This is the canoe, with its big sail, platform and outrigger.

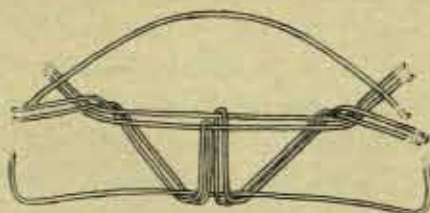


FIG. 35.—A CANOE.



XXXVIII. *A Paddle (Voi).*

Place the loop over the left wrist, palm upward, and loop the nearer wrist string round the little finger from the distal side. Pass the right hand round the distal side of the ulnar left little finger string and the proximal side of the radial wrist string, and take up with the front of the little finger (*i.e.*, from above) the palm cord running from the wrist to the little finger. Draw the two hands apart, retaining the loop on the right wrist. Now remove the loops from both wrists and place them on the corresponding thumbs. With the thumbs from the proximal side take up the radial little finger strings, and with the index fingers from the proximal side take up the ulnar thumb strings. Circle the right hand under so that its palm lies against the body, and push the left hand outward. You have the paddle.<sup>1</sup>

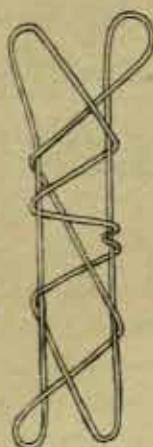


FIG. 36.—A PADDLE.

XXXIX. *A Squirrel (Selese'le).*

Make a small circle and hold it in the mouth, letting the longer loop hang down. Insert the hands through the longer loop from the body side, then with the little fingers take up the string of the circle also from the body side. Draw the hands apart, and drop the loop in the mouth. Between the crossing strings and the ulnar little finger strings take up in the mouth the ulnar wrist string. With the left thumb from the body side take up the string that hangs from the mouth on the right, and with the right thumb the string on the left. Drop the loop from the mouth. Remove the wrist loops and place them on the index fingers. With the thumbs over the index loops take up the radial little finger strings from the proximal side, and with the index fingers from the proximal side take up the ulnar thumb strings. Drop all the loops on the thumbs. Transfer the distal index loops to the thumbs. Again with the thumbs over the index strings take up the radial little finger strings from the proximal side, and with the index fingers from the proximal side take up the ulnar

<sup>1</sup> I am a little doubtful about the accuracy of this figure.

thumb strings. Drop all the thumb loops and push the hands from the proximal side through the distal index loops. With the right thumb and index finger take hold of the left ulnar index string and the radial little finger string, and release all the left hand. Insert the left thumb through the old wrist loop from the opposite side to that in which the hand went through, and replace the index and little fingers in their former loops. Do the same with the right hand. With the thumbs over the index strings take up the radial little finger strings, and with the index fingers the ulnar thumb strings, both from the proximal side. Turn the palms outward. You have the squirrel *Selese'le*.



FIG. 37.—A SQUIRREL.

#### XL. *A Bad Pot (Weleta'ka ana yabelo'lo).*

Double loop round the foot. Hold the end of the inner loop in the mouth, take hold of the side strings of the other loop, one in each hand, and, bending them round to the back of the loop held in the mouth, transfer each string to the other hand. From the body side insert a hand through each loop that lies on either side of the central loop held in the mouth, and, also from the body side, take up with the index fingers the strings of the central loop, and pull them back through the side loops, one on each side. You have Fig. 38 ("A Bad Pot").

Take up from the distal or foot side with the little fingers the transverse strings at X and X, then from the same side Y and Y with the thumbs. Release the strings from the foot. With the thumbs from the proximal side take up the radial little finger strings, and with the indices from the proximal side the ulnar thumb strings. Turn the palms outward. Two interlacing strings appear, one on each side of the eyelets in the middle. Drop all the loops except those on the little fingers, and take up these crossing strings from the proximal side with the thumbs. With the thumbs from the proximal side take up the radial little finger strings, and with the indices from the proximal side take up the ulnar thumb strings. Turn the palms outward. Two diagonals cross in the middle. Take them up in the mouth from the distal side. A large triangle now hangs down from the mouth, the mouth being at the apex. Insert the right hand through the triangle from the front (*i.e.*, so that the hand enters it pointing inward towards the body), then on the proximal side of the thumb loops release the left index loop with its distal radial thumb companion string, draw it back through the triangle and place it on the left thumb. Do the same with the right hand and drop the strings in the mouth. With the indices



take up the ulnar thumb strings from the proximal side, and turn the palms outward. You have "The Bad Pot" (Fig. 39).

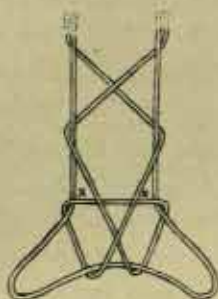


FIG. 38.

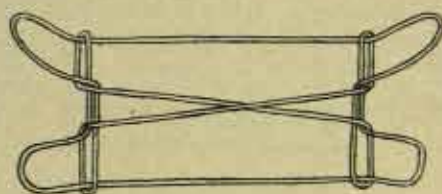


FIG. 39.

#### FIGURES REQUIRING TWO PLAYERS.

##### XLI. *A Boat-sail (Nai'a).*

Two persons, X and Y, sit opposite each other. X with the right hand, Y with the left, make Opening A. X holds all the transverse strings with his left hand, while Y removes each loop in turn from his own fingers, twists them round three times, and replaces them on his fingers. Y now holds the strings while X twists them in the same manner but in the opposite direction. The index loops are then dropped, each thumb loop taken off with the index finger of the other hand, and the figure spread out. You have a large square held by a finger in each corner.

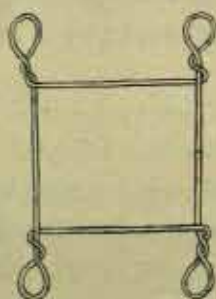


FIG. 40.—A BOAT-SAIL.

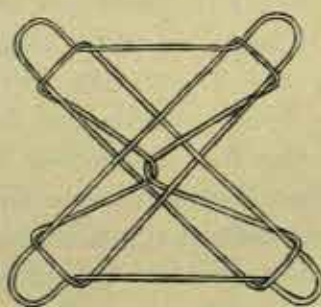


FIG. 41.—THE SAGO PALM.

##### XLII. *The Sago Palm (La'bia).*

This figure also requires two persons, X and Y, sitting opposite each other. Each places one end of the loop around his neck. X claps his right-hand string chanting "*Labia talotalo*," "Sago cut," then his left-hand string, chanting "*Kewala talotalo*," "Parrot cut"; Y does the same. This is repeated two or three times, then each from his right side places both hands over the near right-hand string under the left-hand string and holds the two apart, one in each hand. Then the loops are removed from the necks passed the one through the other and pulled

through the side loops held in each hand, forming a fresh loop on each side. You have the Sago palm.

Lay the figure carefully on the ground. The outer string of each hand passes under another string a short distance in towards the middle of the figure. X takes up each outer string nearest him, after it passes under this other string; Y does likewise. You then have a simple square with the hands in the corners.

#### TRICKS.

##### XLIII. *A Mosquito (Nimo'ga)*.

This is the same figure as "The Lizard" of Murray Island (see Miss Haddon, p. 80). On Goodenough Island it is usually performed only at the season when the mosquitoes appear. The right hand, when it comes away free, is made to slap the thigh of an onlooker, in humorous imitation of a person beating away a mosquito.

##### XLIV. *A Certain Tree (Gi'mo)*.

Hold the loop on the left thumb, the thumb pointing upward. Insert the right index from above (*i.e.*, the distal side) through the loop, draw the hands apart, revolve the left index once clockwise and drop its loop (the finger still pointing downward) on the left thumb. With thumb and finger of the right hand draw both the left hand proximal thumb strings through the distal thumb strings. Place the two loops now held by the right thumb and index finger on the left thumb, the right index finger pointing downward in this operation. There are now four radial and four ulnar strings on the left thumb. Pull the most proximal ulnar string through the middle of the radial and ulnar strings. All the strings come away free from the thumb.

##### XLV. *The Sago Palm (La'bia)*.<sup>1</sup>

Take a loop about a foot long and hold it up in the left palm. Bring the other end over so that one string passes between the index and the middle finger, the other between the ring and the little finger, then bend it round the thumb and back in the same way between the same figures. From the back of the hand loop the remainder over the little finger. A string runs along the back of the ring and middle fingers. Lift this over the top of them, give it one half circle clockwise, and loop it on the left index finger. Two loops pass around the thumb. Remove them, and push them down between the middle and ring fingers so that they project on the other side. There are now on the left hand two loops on the index, two on the little finger, two projecting on the back of the hand between the ring and middle fingers, and one string crossing the palm. Pull this palmar string—the whole resolves.

<sup>1</sup> This appears to be the German trick of Miss Haddon (p. 84), though I cannot produce it from her description. It is practically identical with a trick known to the Eskimo from Pit Barrow, in Alaska, to as far east as Coronation Gulf.



XLVI. *A Jumping Fish (So'uso).*

Opening A. Drop the right index loop so that the palmar string of the left hand crosses above, i.e., on the distal side of, the index loop.<sup>1</sup> Remove the left index loop to the right index and release all the right hand. Hold up the left thumb loop in the right hand and the little finger loop in the left. There is a long pendent loop in the middle. Gently jerk it up and down, chanting "*Tou'to waie'ya ka na ka'oda'mana si evuevuli'o.*" This is the fish jumping from stone to stone. At the final syllables, *'o*, jerk the hands sharply so that the pendent loop is displaced—the fish has disappeared.

XLVII. *Tomobu'la.*

Opening A. Take up in the mouth all the transverse strings. Remove the little finger loop of the right hand to the little finger of the left, the right index loop to the left ring finger, and the right thumb loop to the left middle finger. Insert the right hand through the strings so as to divide the original right-hand strings from the left; place the right palm on the forehead and rub it down the face as though swishing it with water. At the same time drop all the strings of the left hand so that only the mouth holds up the loops.

XLVIII. *A Parrot (Anega'la).*

Opening A. Remove the left-hand loops to the foot, the little finger loop to the little toe, the index to the middle toe, and the thumb loop to the big toe. Under the radial thumb loop draw out the ulnar thumb string; between the ulnar thumb string above and the radial thumb string below pull through the radial index string; between this last and the former two draw out the ulnar index string, and between the index string and the rest the radial little finger string. Finally the ulnar little finger string is pulled through in the same way, and bent back over all the strings, and the loop so formed is placed on the right little finger. Insert the left index finger through the big toe loop just above the toe itself and, drawing it up, place this new loop on the right thumb. Replace the toe loops on the left hand as at first, clap the hands, cry "*Weo*" (imitating the parrot's cry?), and pull the hands apart. You have Opening A as at the beginning.<sup>2</sup>

<sup>1</sup> In making Opening A take up the left palmar string with the index finger of the right hand, then the right palmar string with the index of the left.

<sup>2</sup> There appears to be some error or omission in this description.

## THE NILOTIC LANGUAGES—A COMPARATIVE ESSAY.

By G. W. MURRAY.

## TABLE OF CONTENTS.

|                                      | PAGE |                                   | PAGE |
|--------------------------------------|------|-----------------------------------|------|
| ABBREVIATIONS ... ..                 | 327  | PREFACE—continued.                |      |
| PREFACE ... ..                       | 328  | § 19.—Agential and Instrumental   |      |
| § 1.—Details of the Language-        |      | Particles ... ..                  | 343  |
| groups compared ... ..               | 329  | § 20.—Verbal Nouns... ..          | 344  |
| § 2.—Phonology ... ..                | 329  | § 21.—The Personal Pronouns ...   | 345  |
| § 3.—General Remarks on the          |      | § 22.—The Demonstrative Pronouns  | 346  |
| Verb ... ..                          | 331  | § 23.—The Interrogative Pronouns  | 347  |
| § 4.—The Personal-endings ...        | 331  | § 24.—The Articles ... ..         | 348  |
| § 5.—The Tense Systems ... ..        | 333  | § 25.—The Substantive ... ..      | 349  |
| § 6.—Comparison of Tenses ...        | 334  | § 26.—Substantival Suffixes ...   | 350  |
| § 7.—Negation ... ..                 | 336  | § 27.—Plural Formation ... ..     | 352  |
| § 8.—Extension of root-meanings      | 337  | § 28.—The Plural Suffix -k ... .. | 353  |
| § 9.—Iteration ... ..                | 338  | § 29.—The Plural Suffix -t ... .. | 354  |
| § 10.—Causation ... ..               | 338  | § 30.—The Plural Suffix -in ...   | 354  |
| § 11.—Reflexive or Intransitive      |      | § 31.—Formation of the Singular   |      |
| Action ... ..                        | 339  | from the Plural... ..             | 355  |
| § 12.—Dative Action... ..            | 339  | § 32.—The Genitive Case ... ..    | 356  |
| § 13.—Passives ... ..                | 339  | § 33.—The Objective Cases ...     | 358  |
| § 14.—Quasi-passives (Motion to) ... | 340  | § 34.—Position of the Subject ... | 358  |
| § 15.—Intensives in -n, -d (Motion   |      | § 35.—The Numerals ... ..         | 358  |
| away) ... ..                         | 341  | CONCLUSION ... ..                 | 360  |
| § 16.—Intensives in -j ... ..        | 342  | APPENDIX I.—List of Common Roots  | 361  |
| § 17.—Other Suffixes ... ..          | 342  | APPENDIX II.—Bibliography ...     | 368  |
| § 18.—Compound Verbs ... ..          | 342  |                                   |      |

## ABBREVIATIONS.

|                            |  |
|----------------------------|--|
| A.E. ... Ancient Egyptian. | Mas. ... Massai.                         |
| Ba. ... Bari.              | Mid. ... Midob.                          |
| Bed. ... Bedaanye.         | Nan. ... Nandi.                          |
| D. ... Dongola.            | N.G. ... "Nubische Grammatik."           |
| Dai. ... Dair.             | Nub. ... Nubian.                         |
| Di. ... Dinka.             | O.N. ... Old Nubian.                     |
| K. ... Kenus.              | Shi. ... Shilluk.                        |
| Kan. ... Kanuri.           | Som. ... Somali.                         |
| Kun. ... Kunama.           | S.P. ... "The Shilluk People."           |
| Kunj. ... Kunjara.         | S.S.N. ... "Die sprachliche Stellung des |
| Lat. ... Latuka.           | Nuba."                                   |
| M. ... Mahass.             | Turk. ... Turkana.                       |



## PREFACE.

IN the following essay are set forth in detail a series of parallels, both in grammar and vocabulary, sufficient, in my opinion, to prove the common ancestry of three of the groups of languages compared, viz., Nubian, Bari and Masai; and, in the second place, to establish the strong probability of a former connection between these three and a fourth—Shilluk (with which must be included Dinka also).

The contrasts between the first three and the last are, however, formidable. Masai, Bari, and possibly at one time Nubian also, distinguish grammatical gender; while the personal-endings of the Masai and the Nubian verbs, with the host of prefixes and suffixes which extend the meaning of the verbal stems and form the plural of the substantives, give sufficient reason for terming all these three languages agglutinative.

Shilluk, however, except for one dialect, Acholi, does not distinguish gender, and, although it has borrowed the plural suffixes of the other three, may fairly be termed isolative. Westermann is therefore probably right in including it with the Sudan languages. As regards the other three, after all the Hamitic particles and personal-endings have been eliminated from the grammar, and the host of Hamitic and Semitic roots from the vocabularies, there yet remains a large residual defying correlation with anything Hamitic or Semitic. Particularly is this the case in the vocabulary, where the number of monosyllabic roots common to all the groups and absent from their Hamitic neighbours is very striking (see Appendix I). The presence of musical intonation in the Masai group, the fact that the Nubian and Bari subjects precede the verb, the absence of case-endings from all but Nubian, the absence of personal-endings from the Bari verb, the absence of grammatical gender from Suk and Nandi, are all links with the Sudan languages.

The Hamito-Semitic influence on these first three languages is so strong that we may certainly call them Niloto-Hamitic with Westermann, and adopt his name Niloto-Sudanic for the Shilluk-Dinka group. But I am unwilling to believe with Meinhof, that Masai, for instance, is a Hamitic language influenced by contact with Sudanic—it appears preferable to imagine that the more developed influenced the less, and that Nubian, Bari and Masai were once Sudan languages, like Shilluk, by origin, but to be now so overlaid by a common foreign influence as to have developed into a very characteristic sub-family.

The parallels we are going to discover in the following pages may therefore be divided into two classes:—

1. Those due to this common foreign (Hamitic) influence, due to a language, now probably extinct, but akin to the modern Kafa or Galla when it existed.
2. The vestiges of four cognate Sudan dialects, which represent the state of the present Nubian, Bari, Masai, and Shilluk groups before the intrusion of this common foreign influence.



## § 1.—DETAILS OF THE LANGUAGE-GROUPS COMPARED.

The four groups of languages, spoken by tribes of mixed Negro and Hamitic descent, which it is proposed briefly to compare within the limits of this article, are—

A.—*Niloto-Hamitic.*

- i. *Nubian*, spoken on the Nile, between the first and fourth cataracts, by a Hamitic type resembling the Somali, and in various scattered hill-groups in Kordofan and Darfur, by short, sturdy negroes.

Dialects: *Kenus-Dongola* and *Mahass* on the Nile, *Dair* in Kordofan, and *Midob* in Darfur.

- ii. *Bari*, spoken on the Bahr-el-Jebel by a once numerous and warlike race, now a small tribe with very few cattle.

- iii. *Masai*, spoken in Eastern Equatorial Africa by a race with marked Hamitic traits of appearance, though these do not predominate.<sup>1</sup> *Suk* and *Nandi* are closely related idioms; *Turkana* and *Latuka* appear to be sub-tribes of the group, speaking purely linguistically, of course.

B.—*Niloto-Sudanic.*

- iv. *Shilluk*, spoken on the White Nile by tribes in which a tall, very black negro type predominates. Westermann gives as dialects of Shilluk, *Shilluk* proper, *Anywak*, *Dyur (Jur)*, *Beir*, *Gang (Acholi)*, *Nyifwa (Jaluo)* and others. *Dinka* and *Nuer*, though separate languages, may be classified together in this group.

## § 2.—PHONOLOGY.

(a) *Vowels and Diphthongs*.—These vary very much dialectically within most of the languages examined. Lepsius gives in Nubian ALUM, ELUM, OLOM, and ULUM all for *crocodile*, while in Mitternutzner's "Sprache der Bari," AN, EN, ON, ÖN and UN appear as forms of the same verbal suffix. The Shilluk vowels may be either long or short in many words, while Beech's remarks about the Suk might almost stand for the whole Masai group. "Beyond the fact that vowels mark the person in verbs, and that with certain nouns, the singular is only distinguished from the plural by vowel-change, the vowels of this group are not carefully distinguished

<sup>1</sup> A curious detail suggesting that there were connections between the ancestors of the Masai and the Nile basin in the earliest historic times has been noted by Seligman ("Ethnic relationship of the vanquished . . . on . . . protodynastic Egyptian palettes" in vol. vii of *Annals of Archaeology and Anthropology*). One of the slate palettes recording the victories of the protodynastic Egyptians shows that the conquered, a race with woolly hair, practised the unusual form of circumcision still in vogue among the Masai.



Thus I and E are frequently interchanged, as are also O, U and A. Similarly the diphthongs AI, EI, and OI may be said to be practically interchangeable."

(b) *Consonants*.—All the languages compared agree remarkably in preferring the primitive consonants CH, T, D and P rather than the corresponding younger forms SH, S, Z and F. This last letter indeed occurs as interchangeable with P in Bari and Shilluk, and as a variant of B in the Mahass dialect of Nubian. But the Nubians of the Christian period wrote it TT, and it seems likely that SH, S, Z and F formed no part of the original Nilotic system of phonetics, and that when they occur nowadays the presence of SH, S and Z at any rate mark the intrusion of a Hamito-Semitic form.

H is another almost certain sign of a loanword. It occurs, however, in a few Nubian, Masai and Shilluk exclamations, and dialectically in the Dinka dialects north of the Sobat. It also occasionally replaces s in the Midob and Mahass dialects of Nubian.

GH, a softened form of the Arabic Ghain, occurs in Dinka and Shilluk, and dialectically perhaps, for Meinhof did not notice it, in Suk and Masai. It interchanges with W and G, and Westermann considers it an older form of the latter letter.

O and Y are frequently nasalised, and when this occurs, I have written Ń and Ț; Ń is the NG of *singer*, and Ț the NY of *canyon*.

Metatheses such as DARĒ = NERĒ, Nub., and DŪTIN = NUNTIN, Nub., show that a nasalised D existed in Nubian as it does to-day in Masai.

The J written here represents the soft J in jeer, jest, etc., and DY the other letter frequently written J in the grammars hitherto published of Nubian, Bari, Masai and Shilluk.

The letters L, R and Y do not occur initially in Nubian, and N, when it occurs initially in the MSS. of the Christian period, is always written □, the sign for Ń (NG).

(c) *Semi-vowels*.—Y is always a semi-vowel, as in YET; it never has the AI-sound of English Y in TRY. When commencing a word, both Shilluk and Nubian prefix a slight I sound, thus, IYŌYO, K., *my mother*; IYĒYO, Shi., *to believe*.

Similarly with W—Shilluk UWAB, Nubian AWAB for WAB, *might*.

The semi-vowels within a word are probably original vowels, W = U and Y = I. Many long vowels represent a contraction of a semi-vowel and a vowel, or rather the two original vowels of the root, e.g., Shilluk RŌDO for FWO DO (Dinka PUOT), beat.

The presence of these semi-vowels leads to curious interchanges rare in European languages, e.g.—

1. The ordinary exchange of L for D (*Lachryma* = δακρυ) may be extended when a semi-vowel follows the L or D as in—

*Tongue*—Di., NAL., LYEP, Shi., LEP = Ba., DEB, Mas., JEP (for DYEP).

2. The disappearance of the initial consonant in such a case may give rise to strange equivalents. L or D may drop out as in—



*Hear*—Shi. LIÑ = Ba. YIÑ = Mas. NIÑ—all from an original LYIÑ, NYIÑ.  
 K or G are very frequently lost before a semi-vowel. KUARSH Dair  
*six* and KUALAD *seven* were recorded by Rüppell and also Russegger from  
 other hill-colonies in Kordofan as FARSH and FALAT; while on the Nile,  
 the semi-vowel has disappeared and we have GORJ, KOLOD.

I have not observed an actual case of MW = ŃW, an interchange recorded by  
 Meinhof from other African languages, but the following comes very close to it :—

*Blunt*—Suk. MUTU-S, Nub. MUTU, Ba. GWUTU, Nan. ŠUTU-M.

Also compare—Ba. GWARŪT for Arabic BARŪD, but the influence of the Masai  
 article EŃ may perhaps be traced here.

(d) *Musical Intonation*.—The Shilluk and the Masai groups are mentioned in  
 the literature on the subject as intoning, and we may suppose that intonation once  
 existed or perhaps has escaped notice in the others. Its presence may be looked for  
 in cases where the same forms occur for singular and plural, as sometimes in Bari.

It seems to serve only to denote changes of flexion. Meinhof says (*Die Sprachen  
 der Hamiten*, p. 16) : "I have certainly noted intonation in Masai and its related  
 languages; however, as yet it has not been proved that it serves here to distinguish  
 between roots."

### § 3.—GENERAL REMARKS ON THE VERB.

The primitive Nilotic verb, like the substantive, was monosyllabic, and consisted  
 originally of a consonant, a vowel, and a consonant; or a consonant, a semi-vowel,  
 a vowel and a consonant, *e.g.*—

BOG, FOG, Nub. BUK, Ba. IPUK, Mas. BYOK, Di. *Pour away.*

DUMM, Nub. DUM, Ba. TUM, Mas. DAM, Di. *Catch.*

From these original forms we get variants, due to the foreign influence to which,  
 at an early date, these groups were exposed, such as the extension of the root-  
 meaning by affixes, or the compounding of two verbs (Nubian), or a verb and a sub-  
 stantive (Nubian and Dinka), or reduplication of the original root. This last is a  
 common feature in Hamitic languages, but as it is absent from Shilluk and rare in  
 Dinka, I conclude that it is not a native Nilotic idiom.

Many purely Hamitic and Semitic loanwords occur in the vocabularies, *e.g.*,  
 Nubian has a numerous class of Arabic roots which have a slightly altered method of  
 conjugation; but I omit all reference to these as having no bearing on the objects  
 of this article.

### § 4.—THE PERSONAL-ENDINGS.

Here only do we find the grammatical constitutions of the various groups  
 seriously at variance. The Nubian and the Masai personal-endings bear no signs of  
 being derived from a common ancestor, except that in the ultimate issue, they all  
 probably go back to the personal pronouns. As neither Bari nor any member of the



Shilluk family possesses any personal-endings at all, and as considerable differences exist dialectically among the groups that have adopted them (*cf.* Suk and Nandi with Masai), we may presume that they are due to secondary influences coming later than the first intrusion which originated the other Hamitic features, common to all the three first groups, such as the verbal root-extensions and the plural suffixes -K, -T and -N.

i. *The Nubian Personal-endings.*—These can be seen in the following paradigms, which we will recur to again in the sections on tense. The letters in brackets are generally elided before consonants, while the final A of the third person plural, M, is restored on the authority of the O.N. MSS. :—

| <i>Imperfect.</i> |                         |              |
|-------------------|-------------------------|--------------|
|                   | KD.                     | M.           |
| <i>Singular—</i>  | 1. TOG-R-I(M)           | TOG-IR       |
|                   | 2. TOG-IM, K., -IN, D   | TOG-IN-AME   |
|                   | 3. TOG-IM, K., -IN, D   | TOG-IN       |
| <i>Plural—</i>    | 1. TOG-R-U(N)           | TOG-UR       |
|                   | 2. TOG-R-U(N)           | TOG-IRO-KOME |
|                   | 3. TOG-R-AN             | TOG-IN-NAN   |
| <i>Aorist.</i>    |                         |              |
| <i>Singular—</i>  | 1. TOG-S-I(M)           | TOG-IS       |
|                   | 2. TOG-S-UM, K., -UN, D | TOG-ON-AME   |
|                   | 3. TOG-S-UM, K., -UN, D | TOG-ON       |
| <i>Plural—</i>    | 1. TOG-S-U(N)           | TOG-US       |
|                   | 2. TOG-S-U(N)           | TOG-SO-KOME  |
|                   | 3. TOG-S-AN             | TOG-S-ANA    |

It will be at once evident that, allowing for minor differences, R is the sign of the imperfect, S that of the aorist tense, and that these two letters, which will be considered elsewhere, form no part of the personal-endings proper. That they once occurred in all persons may be inferred from inspection of the O.N. forms, which for the aorist singular, are 1, -SI(N). 2, -SIN. 3, -SNA.

Another point to be inferred from the O.N. forms as given above is that the suffix (only found in the second person, Mahass dialect)—

-AME, *plural* -KOME,

was not always present. The K of KOME I take to be the plural affix, prefixed in Bari and Masai to pronominal forms.

We thus arrive at the following inferred personal-endings—

*Singular* 1, 2 and 3, -IM, -IN. *Plural* 1 and 2, -UN. 3, -AN.

I take it that the vowels of these forms corresponded once with those of the personal pronouns, though there is little or no trace of that now, and that the terminal

-M, K., -N, DM., was the copula, which we find attached to the numerals and to substantival forms to-day, *e.g.*—

WĒR-U(M), K., WĒR-U(N), D., *one.* OR-IM, KD. (*it is*) *cold.*

It should be noted here that there is a trace of an objective personal suffix such as exists in Suk and Nandi. When the verb has a plural object, Mahass inserts -J- between the stem and the personal-ending—

AI TOG-J-IR, *I am striking (several).*

This J is no doubt the plural suffix K, softened as it frequently is. See § 28.

KD. substitutes -IR- for J.

NOTE.—Reinisch (S.S.N., pp. 3-12) wishes to derive the personal-endings from a compound of the personal pronouns with the primitive verb HÂN, KÂN, *to be.*

ii. *The Personal-endings of the Masai Group.*—Masai and the other members of the same family, while differing among themselves, all agree in possessing prefixes and sometimes also suffixes, which vary as the personal pronouns concerned are the subject or object of the verb.

(a) Masai possesses—

Special prefixes, which are used to denote the subject, with the exception of the first person plural. These prefixes change, when the object is the first or second person singular, thus:—

*Singular.*

*Plural.*

- |   |  |
|---|--|
| 1. A-SUJ, <i>I follow him, her, us, ye, them.</i>   | KI-SUJ, <i>we follow him, her, etc.</i>      |
| AA-SUJ, <i>I follow thee.</i>                       |  |
| 2. I-SUJ, <i>thou followest him, her, us, etc.</i>  | I-SUJU-SUJU, <i>ye follow him, her, etc.</i> |
| KI-SUJ, <i>thou followest me.</i>                   | KI-SUJU-SUJU, <i>ye follow me.</i>           |
| 3. E-SUJ, <i>he (or she) follows him, her, etc.</i> | E-SUJ, <i>they follow him, her, etc.</i>     |
| AA-SUJ, <i>he follows me.</i>                       | AA-SUJ, <i>they follow me.</i>               |
| KI-SUJ, <i>he follows thee.</i>                     | KI-SUJ, <i>they follow thee.</i>             |

(b) Nandi—

Prefixes A, I, KO, *plural* KI, O, KO, to mark the personal pronoun of the subjects, and suffixes A or O, I or E, KO, *plural* KI or ECH, AK or OK, to mark the person of the objects.

(c) Suk—

Prefixes a form of the personal pronoun, and, in addition, has both subjective and objective affixes, distinguished only by vowel-change, for person.

#### § 5.—THE TENSE SYSTEMS.

(a) *Primitive Tenses.*—The Nilotic languages all appear to have commenced life, as it were, with only two primitive tenses—the one, which we may call an aorist, denoting completed action; the other, an imperfect, marking action in progress. The aorist we may suppose to have originally consisted simply of the root itself;



the second or imperfect to have been denoted by the addition of a particle, or, as in Bari nowadays, by reduplication of the root.

(b) *Derived Tenses*.—Further tenses were added as the languages developed by the addition of particles, themselves originally verbal roots, meaning *to come, to have with one, to repeat*, etc. The tendency of the Masai and Bari groups, however, was for these particles to express a change in the action itself rather than a change of the time of the action. Nubian, however, in addition to a rich variety of suffixes expressing change of quality, possesses many tenses formed by the addition of the verbal roots *come, have, be wont*, etc. Imperfect, aorist, perfect, pluperfect, future, future aorist, future perfect, future pluperfect, etc., can all be distinguished, but all these with the exception of the two first are formed by the addition of other verbal roots, and are clearly of later origin.

As these derived tenses are clearly due to the Hamitic influence, they are naturally almost confined to the Niloto-Hamitic groups, but not entirely. The future in Dinka and Shilluk resembles that in Nubian and Masai, while Shilluk has a habitual tense formed by a suffix.

#### § 6.—COMPARISON OF TENSES.

##### A.—*The Primitive Tenses Compared.*

i. Nubian. From the paradigms given above in § 4, it may be seen that the aorist is distinguished from the imperfect simply by the alteration of a letter, *s* in the one tense, *r* in the other, which is inserted between the stem and the personal-endings.

Reinisch (S.S.N., p. 12) points out that this *r* alters to *d* after the liquids *l, r* and the nasal *n*, and would trace it back to an original *t*. (He would refer the *s* of the aorist also to this original *t*, since he considers that Nubian, like Agau, possessed originally but one primitive tense.)

If this *r* is indeed the representative of an original *t* denoting incompleted action, the coincidence with the Masai suffix *-ITA* (see below) is striking.

The *s* of the aorist I believe to have originated in the following manner. It is replaced in the Midob dialect by *h*, and when this occurs in Nubian dialects, the presumption is that both are descended from an earlier *sh*. Cf. *osi, KD., ōi, M., for ohi, leg.* from an earlier form *oshi*, which does in fact occur in Dair.

This *sh* in itself is not a Nilotic letter, but might represent an earlier *ch*, which would bring the Nubian sign for the aorist into line with that in Dinka (see below).

ii. Bari, unlike the other languages, makes use of reduplication to express the imperfect—

*Aorist*.—NAN ŃECHU, *I eat.*

*Imperfect*.—NAN ŃEŃECHU, *I am eating.*

iii. Masai suffixes *-ITA* to denote the imperfect—

*Aorist*.—A-SUJ, *I follow.*

*Imperfect*.—A-SUJ-ITA, *I am following.*

iv. Shilluk distinguishes the imperfect from the aorist by the addition of a vowel.

YĀ CHAM, *I ate.* YĀ CHĀMO, *I am eating.*

But Dinka prefixes CHI-, as Nubian once suffixed it (if the supposition of subsection i. be accepted)—

*Imperfect.*—AN A GAM, *I am hoping.*

*Aorist.*—AN A CHI-GAM, *I hoped.*

To sum up, Nubian has enclitics to denote both primitive tenses. In Shilluk, Bari and Masai the aorist is represented by the stem, though Dinka uses it for the imperfect. The aorist particles in Dinka and Nubian are similar, so are the Masai and Nubian particles for the imperfect. Bari alone employs reduplication to mark the imperfect.

#### B.—*The Derived Tenses Compared.*

(a) *The Future.*—This is expressed in most of the languages considered by prefixing to the imperfect a particle, reminiscent of a verb “to be,” e.g.,

i. Nubian. BI-, KD., BU-, D., FA-, FAYA-, M., prefixed to the imperfect, as

AI BI-TOG-RI, KD., *I shall strike.* AI FA-KAB-IR, M., *I shall eat.*

NOTE.—I have heard this particle separated from the stem as FA SHAI-GA AWA-TĒ-RŪ, *let us make and give tea*, M. Perhaps an isolative reaction from an agglutinative foreign influence?

Future aorists are also formed, BI-TOG-SI, etc.

ii. Bari. No tense; if the idea of future time has to be stressed, the particle DE *afterwards* is inserted between the pronoun and the verb in the imperfect tense, as NAN DE NĒNECHU, *I shall be eating later on.*

iii. Masai -U, Nandi IP-. These are suffixed and prefixed respectively to the aorist. A NYOR-U, *I shall love.* The Masai future is only rarely found, the imperfect with the word ADDE *afterwards* (cf. Bari) being generally used instead. The Suk also use the imperfect with an adverb denoting future time.

NOTE.—An alternative Nandi prefix is INYO-, *going*. Hollis gives the meaning of IP- as *coming*.

iv. Shilluk U-, Dinka BI-, are both prefixed to the imperfect as

YA U-CHĀMO, Sh. EN A BI-CHAM, Di., *I shall eat.*

Reinisch connects all the foregoing particles with the verb “to be” in its various forms—Nub., BŪ, KD., FĪ, M., Shilluk, BĀ, BA. Dinka, BA, BI, and points out the similarity with Kunama BĀ and A.E., FW, PU.

NOTE.—The Mahass dialect of Nubian has two other futural particles, both suffixes -AL, -AB (O.N. ARR) and -DIL, -DAL. Reinisch connects these with DĀR, *to be*. The Dair dialect has a futural suffix -SHEER, probably connected with the root SHUR, *come*.



(b) *The Perfect*.—Most of the languages have a perfect, but in view of the different roots meaning *to have* used in forming it, no particular resemblances can be discerned in the forms.

- i. Nubian forms the perfect tenses by suffixing the verb—

KŌ, KD., KUN, M. (Dair, KUAL), *to have*.

AI TOG-KŌ-RI, AI TOGA-KUNN-IR, *I have struck*.

AI TOG-KŌ-SI, AI TOGA-KUNN-IS, *I had struck*.

- ii. Bari prefixes A- for the perfect—

NAN A-FAYU, *I dissembled*.

- iii. Masai prefixes TU- and suffixes -A : except in the case of verbs with an initial I, when -A alone is suffixed—

A TU-SUJ-A, *I followed*. A-INOS-A, *he ate*.

(c) *Habitual Tense*.

- i. Nubian prefixes Āg-, generally contracted to Ā, to the whole paradigm of the verb, thus forming a mood rather than a tense—

AI ĀG-TOG-RI, *I am wont to strike*.

- ii. Shilluk prefixes Ńi- to the imperfect—

YA ŃI-CHĀMO, *I used to eat*.

§ 7.—NEGATION.

A. *The negative prefix M-*

- (a) Traces exist of an universal negative particle M-, e.g.—

Nub. ŌN, KOM, *love*, neg., M-ŌN, *hate* (cf. MĀNO, Shi., MAN, Di., Ba., MEN, Mas.).

ESK, KOM, *can*, neg., M-ESK, *be unable*.

EN, KOM, *be*, neg., M-EN, *not to be*.

ĀR, KOM, *find*, neg., M-ĀR, *not to find* (MĀR, Din.).

IN, KOM, *this*, neg., M-AN, *that*.

ĪN KOM, *right*, neg., MA-ĪN, *left*.

YIŃ, Ba.

LIŃ, Shi.

NIŃ, Mas.

} *hear*, neg., MIŃ, Ba., Shi., Di.  
original root LYIŃ or NYIŃ.

WAIYI, KM.

WAYU, Ba.

WEI, Nar.

} *be well*, neg. { M-WEIY, Mas., *ill*.  
MYEN, Ba., *ill*.  
Cf. M-WEYO, Bagirmi, *ill*.

- (b) This negative M- appears in the paradigms of the verb as follows :—

- i. Nubian suffixes the verb M-EN, *not to be*, to the verbal root and conjugates it.  
ii. Masai forms the negative future and imperfect of all verbs by prefixing M-,

e.g.—

M-A-SUJ, *I follow not.* M-A-NYOR-U, *I shall not love.*

Suk and Nandi, like Nubian, prefix M- throughout the verb.

- iii. Shilluk has a negative particle BA, FA, which is prefixed—

A-BA-KET, *he did not go.*

This negative particle is undoubtedly Hamitic. Cognate forms are Som., MA-; Saho & Agar, MĀ-; Bed., BĀ-; A.E., M in the negative imperative; Coptic, ME, and cf. Hausa, BA, *not*.

B.—*Other negative particles.*

Dinka, Bari and Masai have a remarkable common practice of using particular negative particles with (a), the imperfect and future, (b) the aorist of the verb.

- i. Bari prefixes TI to the imperfect (whose stem is not reduplicated) and KO, AKO, KU to the aorist.

NAN TI NECHU, *I do not eat.* NAN AKO YUF, *I thought not.*

KO also occurs in the imperative.

KO BI, *do not suck!* KO CHAB, *do not judge!*

NOTE.—KO, KU occurs in Shilluk.

KU KET, *do not go!*

KU WĒR, *do not be angry.*

- ii. Masai prefixes M to the imperfect and future, as seen above, and EITU to the aorist. Hollis connects EITU with the verb ITU, *return*—example, EITU A-SUJ, *I did not follow.*

- iii. Dinka prefixes CHI, ACHI to the imperfect and future, and KE, AKE, KECH to the aorist. These resemble the Bari prefixes—

AN ACHI LO, *I do not go.* AN AKĒ CHAM, *I have not eaten.*

§ 8.—EXTENSIONS OF ROOT-MEANINGS.

The Niloto-Hamitic languages, Nubian, Bari and Masai, through exposure to foreign influences, have entered a far more developed stage than the Niloto-Sudanic, Shilluk and Dinka; and in these languages particularly, the meaning of roots, verbal commonly but also substantival, is peculiarly liable to amplification. The methods by which this result is attained are threefold—i. reduplication; ii. extension of the roots by suffixes and prefixes; iii. the combination of two or more roots. There is iv. a special case in Shilluk, where the active voice loses its final vowel to form the passive.

It is, however, the second method which predominates throughout the Niloto-Hamitic groups, and in these there exists a remarkable agreement not only in the different extensions of meaning given to the verb, but also in the affixes themselves employed. Further, so completely is the scheme developed, that no exact parallel, so far as I know, exists among other languages, and it may be considered one of the main characteristics of the Niloto-Hamitic sub-family. The following are naturally the chief causes of root-amplification, though many less important occur, particularly



in Nubian, where, as almost any verbal root may be compounded with any other, the shades of meaning that can thereby be conveyed to the root are almost limitless.

- |                                       |        |  |
|---------------------------------------|--------|--|
| 1. Iterative                          | ... .. | ... effected by reduplication.   |
| 2. Causative                          | ... .. | " " { prefix TA-, TO- (Masai, Bari) or<br>suffix -AY, -YE (Nubian, Masai). |
| 3. Reflexive or intransitive          | ... .. | " " suffix -J, -CH, -SH (Nubian, Bari, Masai).                             |
| 4. Dative                             | ... .. | " " suffix -KIN, -CHI (Bari, Masai).                                       |
| 5. Passive                            | ... .. | " " various methods.   |
| 6. Quasi-Passive (motion to)          | ... .. | " " -AN, -UN, -U (Nubian, Bari, Masai). Traces in Shilluk.                 |
| 7. Intensives in -R, -D (motion away) | ... .. | " " suffixes -R, -D (Nubian, Bari and Masai).                              |
| 8. Intensives in -J                   | ... .. | " " -J, -DYA (Nubian, Bari).   |
| 9. Other suffixes                     | ... .. |  |
| 10. Compound Verbs                    | ... .. | " " verb + verb (Nubian); substantive + verb (Nubian, Bari and Dinka).     |

#### § 9.—ITERATION.

Iteration, when it is not expressed by the habitual tense (see § 6), is generally rendered by reduplication of the verbal stem, which has sometimes in addition an intensive effect on the verb.

- i. KAKKAB, M., *eat quickly*. WASAWAS-Ē, K., *swim with a breaststroke*.
- ii. Reduplication as an extension of the root-meaning is rare in Bari, where it is already employed to denote incompleted action in the imperfect tense. Examples, however, occur—

JUJU, *hatch*. KUKUDI, *tick*. TITIBU, *tattoo*.

- iii. Masai has IDUÑIDUÑ, *cut up*. ITYAMITYAM, *jump about*, etc.  
Nandi ITUNITUM, *shake trees*. CHEÑCHEÑ, *search here and there*.  
Suk MUNMUT, *chop in pieces*. SOSOCH, *shake up*.
- iv. Dinka has TYATTYAK, *flow, surge*. LO-TOMTOM, *break to bits* intrans.

But reduplication does not seem to occur in Shilluk.

#### § 10.—CAUSATION.

A.—Bari and Masai employ prefixes strongly reminiscent of the Ethiopic causative-reflexive prefix TA- (the Arabic reflexive IT-). Nandi suffixes -IT. Examples:—

|       |                               |                               |
|-------|-------------------------------|-------------------------------|
| Bari  | TO-DORO, <i>make fall</i> .   | TO-YUF, <i>make believe</i> . |
| Masai | ITA-SUJ, <i>make follow</i> . | ITA-GOL, <i>make strong</i> . |
| Nandi | SOP-IT, <i>make heal</i> .    | WEGH-IT, <i>make fear</i> .   |

NOTE.—Meinhof considers this prefix to be related to or identical with the TA, TO of the perfect tense.

B.—With verbs that commence with an initial *i*-, Masai suffixes -YE, Nandi -E. Cf. the Nubian (Mahass) causative suffix -AY.

BAÑ-AY, *make talk*. DOLL-AY, *make love*. NOG-AY, *make go*.

But the common Nubian causative is formed by suffixing the verb GIR, KIR, *to make*; KULLI-KIR or KULL-AY, *make learn*, i.e., *teach*.

(iv) NOTE.—Dinka and Shilluk seem to lack any means of rendering causation.

### § 11.—REFLEXIVE OR INTRANSITIVE ACTION.

All the Niloto-Hamitic languages employ similar suffixes.

i. Nubian suffixes -J, -CH—

GÄÑ-J, M., *yawn*. WACH, K., for WAL-J, *bubble out*.

ii. Bari suffixes -JI, -JO, -JU, -JYU—

WALA-JI, *go for a walk*. DUR-JYU, *be sad*.

LALA-JU, *wash oneself*. GOR-JU, *cross oneself*.

iii. Masai suffixes -SH, -ISH, -OSH—

A-RAP-OSH-O, *I have enough to eat*. A-SUJ-ISH-O, *I wash myself*.

Nandi suffixes -SE, -ISIE, -ISYE—

A-MWOG-SE-I, *I shoot*. A-MWET-ISIE-I, *I wash myself*.

iv. Dinka suffixes the word -ROT, *self*—

KUAR-ROT, *make one's escape*. KUAG-ROT, *protect oneself*.

### § 12.—DATIVE ACTION FOR OR AGAINST A PERSON OR THING.

ii. Bari employs a suffix -KIN—

GWÖRÖ-KIN, *buy someone something*. CHARA-KIN, *judge someone*.

RUCHU-KIN, *put on a dress*. FUTU-KIN, *present something to someone*.

iii. Nandi suffixes -CHI—

INEM-CHI, *take from a person*. WE-CHI, *go in place of*.

These may be connected with the Nubian -KID, usually found with the intensive suffix -IR.

MARIS-KID-IR, *disable*.

SOKOS-SID-IR (for SOKOS-KID-IR), *lift up*.

NER-KID, *lull to sleep*.

EGER-KID, *mount, trans*.

### § 13.—PASSIVES.

Various devices are employed:—

i. Nubian suffixes -TAKK, KM., -KATT, D., thus:—

BOG-TAKK, K. FOG-TAKK, M. BOG-KATT, D., *be poured out*.

SOLLI-TAKK, K. OLLI-TAKK, M. SOLLI-KATT, D., *be hung*.

ii. Bari adds a vowel -A, ò, o, to the active—

BUK, *pour*, pass. BUK-ò. YUR, *set fire to*, pass. YUR-A.

KÖR, *spend*, pass. KÖR-ò. WOR, *scrape*, pass. WOR-O.



- iii. Masai is obliged to express the passive by a periphrasis, or an impersonal form, *it has been followed to me*, etc. Suk and Nandi have somewhat similar conventions.
- iv. The passive is sometimes indicated in Shilluk by the alteration of the second consonant, if mute: thus, T, D changes to L, N or R, and B to M; but this is rather a quasi-passive (see § 14). Examples:—

KWOTO, *drive*, pass. KÖL.      TYETO, *carry*, pass. TĒR.  
 KOBO, *speak*, pass. KWOP.      KWATO, *steal*, pass. KWAL.

Sometimes the second consonant remains unaltered, and the active voice is merely distinguished from the passive by the presence of the final vowel -o. This is the exact reverse of the Bari practice.

CHAMO, *eat*, pass. CHAM.      FURO, *live*, pass. FUR.  
 YŌTO, *find*, pass. YOT.

#### § 14.—QUASI-PASSIVES (*Motion Towards*).

Here all the Nilotic groups employ similar suffixes, derived probably from a stem meaning *to go*. The original meaning of this root-amplification was doubtless *motion towards*. When attached to substantival roots an inchoative meaning is implied:—

- i. Nubian suffixes -AN, KD., -AÑ, M.:—

FIR-AN, KD., WAY-AÑ, M., *become fledged*, from FIR, WAY, *to fly*.  
 UGRES-AN, KD., UGRES-AÑ, M., *to dawn*, from UGRES, *day*.  
 ARŌ-AN, KD., NULU-AÑ, M., *grow white*, from ARŌ, NULU, *white*.

NOTE. (i) -AN, KD., AÑ, M., exists as an independent verb meaning *to go*; *become* cf. Masai AGU, *become*.

NOTE. (ii).—The existence of two forms, one in -S, Š, meaning *motion to the speaker*, and the other in -R, meaning *motion away*, seems to be responsible for the peculiar forms of the Nubian verb *to give*.

We have, for the first persons, DĒN, pl. DĒN-J, *give to me*, *give to us*, and TĪR, *give to persons other than the first*. Here the root seems to be TĪ, DĪ, cognate to Bari TĪN, with affixes -KN and -N.

- ii. Bari suffixes -AN, -EN, -ON, -ŌN, -OÑ, -EÑ, -UN:—

MER-AN, *get drunk*.      YUK-AN, *rest, repose*.  
 KWEL-EN, *be beautiful*.      GWOL-ŌN, *dwell, stay*.  
 BUL-ŌN, *be able*.      WOÑ-ON, *be lamenting*.

Note the idea of *motion towards* in

GUK-UN, *invite*.      FUK-UN, *sprout*.

- iii. Suk has a quasi-passive affix -UN, -IN, e.g.—

KUT-UN, *boil*, intr.      PET-IN, *fall in'to*.

Masai and Nandi both suffix -U to denote *motion towards*.

A-SUJ-U, *I follow him hither*.

There is a further suffix -ŃI to such verbs, giving a reflexive or quasi-passive meaning :—

A-SHUK-U-ŃI, *return oneself hither.*

A-SUL-U-ŃI, *fall down hither.*

- iv. Traces of a similar particle occur in Shilluk—in the case of verbs which are virtually adjectives. When these end in a mute consonant, it is nasalized to express inchoative action :—

NOK (*to be*) *little*, alters to NŃŃO, *become little.*

KĚCH (*to be*) *strong*, alters to KĚŃO, *become strong.*

DŌCH (*to be*) *good*, alters to DŌJO, DŌŃO, *become good.*

and in a case where the nasal consonant exists already in the adjectival form

DUOŃ (*to be*) *big.*

DŌŃO, *become big, grow up.*

#### § 15.—INTENSIVES IN -R, -D (*Motion Away*).

It would seem from examples in Bari, that the suffix -RI, -RŌ once conveyed the meaning of *motion away*, perhaps connected with the Nubian postposition -IR, -RO, -RA, meaning *in, at, to*. But in Nubian, Bari and Masai, the suffix -R, -RU, -D now has an intensive or causative effect. Examples :—

- i. -R, -IR (Nubian), like its Bari equivalent, becomes -B after M, -D after N, thus :—

JUG-IR, KDM., *burn hotly.*

JAB-IR, K., *spy* (from JAB, *perceive*).

TOM-B, D., for TOM-R, *break to pieces.* GEN-D, KM., for GEN-R, *reconcile.*

BEN-D, D., *pray* = Bari WAN-DU.

- ii. The Bari corresponding suffix is -RI, -RA, -RŌ, -RU, which preserves the original meaning of *motion away* in such verbs as

WŌGI-RI, *abduct.* BUKŌ-RŌ, *pour away.*

and GWŌRŌ-RI, *sell*, from GWŌRŌ, *buy.*

But another common meaning corresponds to the Nubian, and like it, it alters to -B after M, and -D after N.

NŌMŌ-RŌ, *accompany.* DUMA-RA, *tempt.*

GŌM-BU, *hedge in.*

REM-BU, *slay*, for GŌM-RU, REM-RU.

BŌN-DU, *tremble.*

WAN-DU, *pray*, for BŌN-RU, WAN-RU.

- iii. Masai suffixes -D with an intensive meaning :—

GUR-D, *stir up*, from GUR, *turn, twist.*

BUR-D, *pull out*, from BUR, *pull.*

and there is a trace of it in Nandi WEN-D, *go for a walk*, from WE(N), *go*

But there is another suffix in Masai for the idea of *motion away*. -YA, -YO, sometimes -AA, -OO, thus A-SUJ-AA, *I follow him hither*. Nandi uses -TOI, *away*, and Suk has a class of verbs which suffix -SOI, perhaps with an original meaning of *motion away*.



## § 16.—INTENSIVES IN -J.

- i. -J, -CH in Nubian is sometimes strongly intensive :—

KOJ-J, KM., for KOK-J, *be firmly fixed*.

MEN-CH, M., *stand*, from MEN, *be*.

- ii. Bari has -JA, -DYA with the same meaning :—

DUM-UN-DYA, *deprive of*.

LI-JA, *filter*.

## § 17.—OTHER SUFFIXES.

In addition to the foregoing, all the Niloto-Hamitic languages have coined suffixes independently to express particular needs, *e.g.* :—

- i. BŪ, KD., -FĪ, M., the verb *to be* (which prefixed expresses the future) has been suffixed to indicate a stative idea. -OS, -ED may be suffixed to any Nubian verb, but the alteration in meaning given thereby can now hardly be distinguished. Compare Kafa -BE.

- iii. Masai has a reciprocal form in -ARE, -ORE.

A-SUJ-ARE, *I follow together with someone*.

Nandi has a suffix -TOS, and Suk -SOI, with similar meanings.

These suffixes and the foregoing can moreover be used in conjunction with one another, as in Kafa, *e.g.* :—

JUG-R-AN-BŪ, KD., *be going to be very hot* (intensive + inchoative + stative).

GWÖRÖ-BI-KIN, Bari, *sell for someone* (motion away + dative).

GUK-UN-DYA, Bari, *invite warmly* (motion to + intensive).

## § 18.—COMPOUND VERBS.

Two verbal roots may be compounded together in Nubian, as—

JAK-TOR, *dive*, from JAK, *strike*, and TOR, *enter*.

BEL-JŪ, KD., FALA-JŪ, M., FALA-JOR, O.N., BAL-SHU, Dair, *go away*.

NOTE.—Parallels to this exist in Kafa and Kunama, and supply a strong reason for including the latter language among the Niloto-Hamitic family. Examples :—

Ku. NOGOL, *drink up*, from NO, *drink*, GOL, *destroy*.

Ku. BINI, *take away*, from BIX, *take*, I, *go*.

But the most common compound in Nilotic is a verb and a substantive—

- i. Nubian. DUŠUR-AŠ, M., *go blind*. SHĒK-KIR, M., *make chief*.

- ii. Bari. TO-ŠUTUT, *shorten*. TO-MAGORA, *starve*.

- iv. Dinka. TEM-WEL, *interrupt*, lit. *cut word*.

TEM-UAR, *ford*, lit. *cut river*.

## § 19.—AGENTIAL AND INSTRUMENTAL PARTICLES.

A.—A compound of (1) a prefix to denote habit and (2) a suffix meaning probably *man*, occurs in almost all the Nilotic languages with the signification *agent*.

- (1) The habitual prefix is AG-, Nub., contracted generally to Ā-, KA- Bari, KI- Suk, Nandi, A- Masai (rarely K-), A- Dinka.<sup>1</sup> AG exists as an independent verb in Nubian, meaning *be wont to*.
- (2) The suffix is in Nubian -IL (equivalent to Somali -ĀL in TUM-ĀL, *smith*; JĒD-ĀL, *watchman*). Suk, Nandi -IN, Masai -NI, Bari -NIT, seem to be connected with Shilluk ĀTE, *man*, prefixed to denote the agent.

This suffix occasionally occurs without the habitual prefix, as—

|        |                             |                            |
|--------|-----------------------------|----------------------------|
| Bari,  | DEMA-NIT, <i>sorcerer</i> . | GWEA-NIT, <i>creator</i> . |
| Nandi, | PON-IN, <i>wizard</i> .     | CHOR-IN, <i>thief</i> .    |
| Suk,   | SŌM-IN, <i>beggar</i> .     | POT-IN, <i>liar</i> .      |

Examples of the fuller forms are—

|            |                                  |                                 |
|------------|----------------------------------|---------------------------------|
| i. Nubian, | Ā-NIJ-IL, <i>taylor</i> .        | Ā-JOM-IL, <i>striker</i> .      |
| ii. Bari,  | KA-YURA-NIT, <i>incendiary</i> . | KA-YUKU-NIT, <i>shepherd</i> .  |
| iii. Masai | A-GILA-NI, <i>destroyer</i> .    | A-PURO-NI, <i>thief</i> .       |
| Nandi,     | K-AMUT-IN, <i>leader</i> .       | KI-RUOG-IN, <i>councillor</i> . |
| Suk,       | KI-MET-IN, <i>leader</i> .       | KI-RUOK-IN, <i>chief</i> .      |

and iv. Shilluk—

|                            |                             |
|----------------------------|-----------------------------|
| ĀTE GWOK, <i>workman</i> . | ĀTE TAL, <i>cook</i> , etc. |
|----------------------------|-----------------------------|

Dinka—

|                         |                          |
|-------------------------|--------------------------|
| A-CHUER, <i>thief</i> . | A-LUAK, <i>servant</i> . |
|-------------------------|--------------------------|

The Suk and Nandi suffixes -IN agree with the Masai and Bari -NI, -NIT, in dropping out in the plural, so perhaps they are the same root.

<sup>1</sup> Note that a habitual prefix K-, SH-, combined with another AN, IN, denoting the instrument, was once far more widely spread throughout the Hamitic languages, appears from such examples as—

|              |             |   |
|--------------|-------------|---|
| K-ĀW-WIR-TĒ. | Nub.        | } <i>that which habitually uses wings, bird</i><br>from WIR, BIR, to fly. |
| K-IN-BIR-TĀ. | Saho, 'Afar |   |
| SH-IN-BIR    | Som.        |   |
| SH-IN-BIR-O  | Galla       |   |
| K-AN-FAR     | Bilin       | } <i>lips.</i>  |
| K-AN-FER     | Saho        |   |
| K-AN-FAR     | Kwara       |   |
| KI-FIR       | Khamir      |   |
| A-MIR        | Nub.        |   |
| AN-BUR-EI    | Bed.        |   |
| A-BIR-I      | Zaghawa     |   |



The Nubian -L, in the Dair dialect, also occasionally drops out in the plural. See examples in § 29. For discussion of this point, see § 31, end.

B.—An early instrumental suffix, sometimes used as an agential suffix as well, was -T, -D. (*Cf.* Agau, -TI, TAMB-ITI, *smith.*)

Suk YI-T, Nandi I-IT, Shilluk YI-T, *ear*; all from a root, YI-Š, NYI-Š, *to hear.*

*Cf.* also Dinka, BIR-ID, *needle*, from BIR, *to prick.* Nubian, TAB-ID, *smith.*

Also Masai, compounded with the habitual K, CH-:

CH-OKU-T, *herdsman.* K-URE-T, *coward.*

There is a later prefix, AN, IN, contracted A-, I-, of Hamitic origin—

AW-WIR, Nub., for AN-WIR, *wing*, from a stem WIR, BIR, *fly.*

*Cf.* O-PIR, O-BIR, Mas. K-U-PIR, Ba. (where K is 'the article'). O-BĒR, Shi.

[The Bedauye form is AN-BIR.]

A frequent instrumental suffix in Nubian is -DI, KDM, -DĪ, K.—

KOMSE-DĪ, *lamp.*

BARE-DĪ, *winnowing fan.*

KUSE-DĪ, *key.*

TAGE-DĪ, *basket with a cover.*

Sometimes joined to the verbal (and substantive) stem by the genitive particle -IN; and when thus joined DI sometimes is changed to -NI—

NIJ-IN-DI, KD., *bodkin.*

KOR-IN-DI, M., *pale.*

*Cf.* as an example of agglutination—

AG-IW-J-IN-NI, M., *that which habitually feeds several, i.e., pasture.*

## § 20.—VERBAL NOUNS.

A.—The suffix -AR (Nubian) -ARE (Masai), forms concrete nouns.

i. Nubian, KAB-AR, *bread.*

KUSH-AR, *key.*

ED-AR, *wedding.*

MERG-IR, *girdle.*

iii. Masai, LEJ-ARE, *lie.*

OUR-ARE, *grave.*

LID-ARE, *knot.*

[Reinisch suggests that the Agau dialects afford a parallel, thus—

Khamta, ENS-ARI; Dembea, Kwara, ANF-ARA; Bilin, INF-Ā.

Khamir, EFF-Ā and EFF-ERA, *boy, girl, servant*, corresponding to Nubian ASS-AR, M., AFFI, KD., *boy, child*, and A.E., 'INF.]

B.—The suffix -TI Nubian, -ET Bari, -ATA, Masai, forms both concrete and abstract nouns. Examples—

i. Nubian, -TI.

BAN-TI, *dance.*

MUR-TI, *knot.*

FAB-TI, *writing.*

NUR-TI, *meal.*

## ii. Bari, -ET.

WEL-ET, *ointment*. TOR-ET, *bundle*.WAN-ET, *prayer*. FOT-ET, *soap*.

## iii. Masai, -ATA, -OTO (pl. -AT, -OT).

ÑAL-ATA, *cud*. LAÑ-ATA, *ford*.SIR-ATA, *marking*. IL-ATA, *ointment*.

This would seem to correspond to the Semitic feminine suffix (*cf.* Ethiopic -T, Arabic A-T).

All the Masai forms take the feminine article.

NOTE.—As an example of a compound of this suffix with the habitual prefix KA- *cf.*

KA-FUL-ET Bari, KA-PUR-ET Suk, *fog*,

where the root is FUL (see Appendix I, *fog*).

## § 21.—THE PERSONAL PRONOUNS.

These differ so widely in the various groups, and even within the groups themselves, that, at first sight, it appears very difficult to trace the primitive forms or so ascribe any common origin to the foreign influences to which they have been exposed. The fullest forms are—

*Singular.*

| i.         |        | ii.   | iii.   |      |        | iv.      |        |
|------------|--------|-------|--------|------|--------|----------|--------|
| KDM.       | Dair.  | Bari. | Masai. | Suk. | Nandi. | Shilluk. | Dinka. |
| AI (AYI)   | YĀ-NDI | NAN   | NANU   | ANI  | ANE    | YA-N     | GHA-N  |
| E-R, I-R   | Ā-NDI  | DO    | IYE    | ŃI   | IÑE    | YI-N     | YI-N   |
| TE-R, TI-R | TŌ-NDI | ÑE    | NIN-YE | ÑE   | INE    | GHE-N    | YE-N   |

*Plural.*

|            |        |     |        |      |        |            |       |
|------------|--------|-----|--------|------|--------|------------|-------|
| A-R, U     | Ā-NDI  | YI  | IYO-K  | ACHA | ACHE-K | WA-N, WU-N | GHO-K |
| I-R, U-R   | Ū-NDI  | TA  | INDAE  | AKWA | OKWE-K | WU-N       | WE-K  |
| TI-R, TE-R | TĪ-NDI | CHE | NIN-JE | CHA  | ICHE-K | GE-N       | KĒ-K  |

On examination, these can be simplified somewhat as follows—

- i. The final R of the KDM. forms is clearly a suffix, since it does not appear in the Dair dialect (according to Junker and Czermak). Reinisch considers this terminal R to be identical with the RI of the personal-endings of the verb. The form AYI for the first person, though rarely heard, is probably the older form. For the T in the third person, *cf.* Barea TŌBO, pl. TŌBA.
- ii. Foreign influence, perhaps Semitic, seems to have influenced the Bari first person singular, and the second persons singular and plural.



- iii. The same foreign influence appears in the first person singular and second person plural (Masai); while the forms for the third person (Masai) NIN-YE, pl. NIN-JE, by analogy with the Suk NEN-DE, pl. CHA-NE, are perhaps compounds meaning *he himself, they themselves*. The final -K of the Nandi (and Dinka) plurals is clearly the plural suffix -K apparently reduplicated, as it also appears in the body of the forms.
- iv. The final -N of the Shilluk forms and the Dinka singular, and also the Dair -NDI, are probably enclitics. In Old Nubian, an enclitic -ON was sometimes suffixed, as TAR-ON, *he*. Such a N is possibly copulative, so that the real meaning of the forms would be *it is I*, etc.

Making the eliminations outlined above, and omitting the Dair forms as dialectical, we are left with—

*Singular.*

| i.           | ii.   | iii.   |      |        | iv.      |        |
|--------------|-------|--------|------|--------|----------|--------|
| KDM.         | Bari. | Masai. | Suk. | Nandi. | Shilluk. | Dinka. |
| AYI          | —     | —      | —    | —      | YA       | GHA    |
| E, I         | —     | IYE    | NI   | INE    | YI       | YI     |
| (T) E, (T) A | NE    | —      | NE   | INE    | GHE      | YE     |

*Plural.*

|              |     |     |      |      |        |     |
|--------------|-----|-----|------|------|--------|-----|
| Ā, Ū         | YI  | IYO | ACHA | ACHE | WA, WU | GHO |
| I, U         | —   | —   | AKWA | OKWE | WU     | WE  |
| (T) I, T (E) | CHE | —   | CHA  | ICHE | GE     | KĒ  |

The persons seem to have been distinguished from each other by vowel change and the plural probably by a prefix K. The Nubian forms seem to be so worn down as to have lost their initial consonant. I am tempted to reconstruct the Nilotic personal pronoun as originally something like—

*Singular.* YA, YI, YE, possibly NA, NI, NE.

*Plural.* WA, WI, WE, later K-WA, K-WI, K-WE.

§ 22.—THE DEMONSTRATIVE PRONOUNS.

Two, three and even four demonstrative pronouns are found in some of the languages examined; but all of these seem to be formed by various suffixes from the one root IN, EL, meaning *this*, cognate with such Hamitic forms as Bilin INĀ, Dembea IN, Kwara, Agaumedder EN. Cf. also Kunama INĀ. For the original Nilotic demonstrative pronoun, see remarks in § 26 on the substantival suffix -N.

The demonstrative pronouns of Masai and Bari have been so far influenced by the article that they are inflected for gender. The forms are—

- i. Nubian. IN, *this*, pl. -GŪ.  
MAN, *that*, pl. -GŪ.

Of these two forms one may remark—

- (a) MAN is probably MA-IN—where MA is the negative prefix.  
(b) OL, EL, occurs as a variant of IN, and when it does so, is probably a relic of the lost Nubian article.

ii. Bari has—

- LO, fem. NA, *this*; pl. CHI-LO, KU-LO, fem. CHI-NE, KU-NE.  
LU, fem. NU, *that*; pl. CHI-LU, KU-LU, fem. CHI-NU, KU-NU.

iii. Masai has four forms—

- |  |                        |
|--|------------------------|
| ELLE, fem. ENNA, <i>this</i>                                 | pl. KULLO, fem. KUNNA. |
| LEDO or ELDE, fem. ENDA, <i>that</i>                         | pl. KULDO, fem. KUNDA. |
| ILLO, fem. INNA, <i>this</i> ( <i>previously mentioned</i> ) | pl. LELLO, fem. NENNA. |
| LIDO, fem. IDYA, <i>that</i> ( <i>previously mentioned</i> ) | pl. LEKWA, fem. NEKWA. |

Nandi has also four—

- |   |   |
|---|---|
| NI, <i>this</i> , pl. CHU.                  | NIN, <i>that</i> , pl. CHUN.                  |
| NO, <i>this mentioned before</i> , pl. CHO. | NON, <i>that mentioned before</i> , pl. CHON. |

Suk has three—

- |                                |            |
|--------------------------------|------------|
| ŊI, <i>this</i>                | pl. CHU.   |
| ŊINO, <i>that</i>              | pl. CHUNO. |
| ŊARA, <i>that over there</i> , | pl. CHARA. |

It is remarkable that throughout the Bari and Masai groups, K-, CH-, the plural particle is here a prefix, while attached to the substantive it is a suffix.

iv. Shilluk has three forms—

- |                                |           |
|--------------------------------|-----------|
| AN, <i>this</i>                | pl. A-K.  |
| ENI, <i>that</i>               | pl. ENI.  |
| ACHA, <i>that over there</i> , | pl. ACHA. |

Dinka, according to Mitterutzner, has only two—

- |                   |           |
|-------------------|-----------|
| E, <i>this</i>    | pl. KE.   |
| KENE, <i>that</i> | pl. KAKA. |

§ 23.—THE INTERROGATIVE PRONOUNS.

These exhibit a remarkable similarity throughout all the languages examined.

i. Nubian—

- |              |                      |
|--------------|----------------------|
| <i>Who?</i>  | nī, KD., nā, nāy, M. |
| <i>What?</i> | mān, KDM.            |



## ii. Bari—

*Who?*     ŃA.  
*Which?*   ŃALO.  
*What?*     ŃYO.

## iii.

|               |        |      |        |
|---------------|--------|------|--------|
|               | Masai. | Suk. | Nandi. |
| <i>Who?</i>   | AŃAE.  | ŃO.  | ŃŌ.    |
| <i>Which?</i> | ALO.   | ŃO.  | ŃŌ.    |
| <i>What?</i>  | AIŃO.  | NĒ.  | NE.    |

## iv.

|               |          |            |
|---------------|----------|------------|
|               | Shilluk. | Dinka.     |
| <i>Who?</i>   | AMEN.    | ŃA, YE-ŃA. |
| <i>Which?</i> | AŃO.     |            |
| <i>What?</i>  | Ā        | ŃU, YE-ŃU. |

NOTE 1.—Barea and Kunama have for *who?* NA, NĒ respectively. In Hamitic languages we have Bedaŋye ŃA, *who?* *which?* and in Bilin, Khamir, Kwara an interrogative suffix -NĪ, -N.

NOTE 2.—Nubian MĀN *what?* and Shilluk AMEN, *who?* can be paralleled with Ge'ez MEN-T, Galla MAN, MAL.

## § 24.—THE ARTICLES.

Among the particles, due to Hamitic influence on the Nilotic languages, the so-called "articles," which serve to denote grammatical gender in the Masai and Bari groups, must be included. Traces of a feminine article can be discerned in Nubian, and the Acholi dialect of Shilluk has a prefix corresponding to the Masai masculine article. But in general, the influence which gave birth to the "articles" seems to have stopped short at the two groups first mentioned. Indeed, it is remarkable that Suk, a member of the Masai group, possesses no article. The "articles" may be classified as they resemble the forms found (1) in Masai (2) in Nandi.

A.—The Masai article is almost inseparable from the noun, but can be replaced on occasion by the demonstrative, interrogative, and reflexive pronouns. It assists in expressing the genitive case of nouns (see § 32), and is declined to express a grammatical rather than a real gender. The forms are OL, pl. IL, for the masculine, and EŃ, pl. IŃ, for the feminine.

Bari has a similar particle LO, fem. NA, which has disappeared as a prefix to nouns, but is still retained as a suffix to express the genitive case. It is regularly prefixed to adjectives. Traces of a prefixed article appear in the K-, corresponding to the Masai feminine EŃ, which occurs before many words—

|                        |                          |                       |
|------------------------|--------------------------|-----------------------|
| K-IMAŃ, <i>fire</i>    | K-OLOŃ, <i>sun</i>       | K-OMOŃ, <i>face</i> . |
| K-UFIR, <i>feather</i> | K-AMULĀK, <i>spittle</i> | K-OŃE, <i>eye</i> .   |

Nubian.—A trace of a masculine article may perhaps be discerned in the Old Nubian nominative suffix -L, which does not, however, seem to be connected with gender.

As in Bari, traces of a prefixed *κ*- corresponding to the feminine article are common; and that these are not Masai loan words, borrowed with the article attached, is proved by the circumstances that the Midob dialect generally omits the *κ*-, and that many of the words have no cognate forms in Masai so far as is known, but occur without the prefixed *κ* in Shilluk. Examples—

|                     |           |                   |                    |
|---------------------|-----------|-------------------|--------------------|
| K-OIN, KD.,         | K-ON, M., | <i>face</i>       | Midob ONE.         |
| K-ARĒ, KDM.,        |           | <i>female</i>     | Midob ARR.         |
| K-OBOSH, KD.,       |           | <i>shell</i>      | Shilluk AWOCH.     |
| K-ORĀB, KD.,        |           | <i>spider</i>     | Shilluk ORAP.      |
| and cf. K-AMIS, M., |           | <i>yesterday,</i> | with Arabic 'AMIS. |

Shilluk.—The article does not appear except in the Gang (Acholi) noun-forming prefix LA-, pl. LU-, mentioned above, and in one word—

NA-L, *boy*; fem NA-N, *girl*.

B.—The Nandi article does not seem to be connected with gender. It is appended to the substantive, and declined for number as follows:—

Singular -DO (occasionally TA, TO, DA). Plural -K.

Examples—

PESEN, *debt*—with article PESEN-DO pl. PESEN-UA with article PESEN-UE-K.

ROR, *heifer*—with article ROR-TA pl. ROR-UA with article ROR-UE-K.

NOTE.—A few words which already end with the singular suffix -DO, -TO, take a suffixed article -T, and drop the -DO in the plural—

PER-TO *bark*—with article PER-TE-T, pl. PER with article PER-IK.

KWEN-DO *firewood*—with article KWEN-DE-T, pl. KWEN with article KWEN-IK.

Russegger<sup>1</sup> noted from Jebel Gulfan, a hill group near Jebel Dair, in Kordofan, the words:—

|     |                           |                               |
|-----|---------------------------|-------------------------------|
|     | TITUM, <i>pigeon</i> .    | TITUM-TO, <i>the pigeon</i> . |
| and | BERBERA, <i>a</i> , masc. | BERBERA-DO, <i>a</i> , fem.   |

It is therefore possible that in the many words ending in -DO, -TO (Dair) and the cognate words in -TI, KDM., we see the remains of a singular feminine article of the Nandi type. This Dair suffix -DO, -TO, frequently drops out in the plural, but for its use as a singular suffix see § 31.

## § 25.—THE SUBSTANTIVE.

The Nilotic substantive, like the verb, is a monosyllable. Adjectives are hardly to be distinguished from nouns, and take the same plural endings; and, when these occur, the case-endings as well. Occasionally in Nubian, traces of a copulative

<sup>1</sup> See Russegger, *Reisen in Europa, Asien und Afrika*, vol. iv, p. 355 et seq.



personal-ending occur, showing that the adjective, like the Shilluk adjectives quoted in § 14, and the Nubian numerals, were once verbs.

KUL-UM, M., *fat, strong*—cf. Mas. GOL, *be strong*.

UR-UM, M., *black*—from a root HUR, SUR, cf. Barea SŪR.

OR-IM, KM., *cold*—cf. Di. WIR.

The numerals have the personal-endings in all dialects.

WĒR-UM, K.      WĒR-UN, D.      WĒR-A, M. *one*.

ŌW-UM, K.      ŌW-UN, D.      UW-O, M. *two*.

## § 26.—SUBSTANTIVAL SUFFIXES.

### A.—The suffix -Ń.

The most common Nilotic substantival suffix appears to be -Ń, which occurs in all the languages, though sometimes a variant -K or -CH takes its place, particularly in the Shilluk group. With reference to this suffix, Westermann's remarks (*S. P.*, p. 64) about the simplest form of the demonstrative pronouns should be taken into consideration. He interprets the Shilluk method of nasalizing the last mute consonant of substantives as connoting a reference to a person or object just mentioned. Thus—

GWOK, *dog*.      GWOŃ, *the dog just spoken of*.

JĀGO, *chief*.      JĀŃ, *the chief just spoken of*.

MĀCH, *fire*.      MĀŃ, *the fire just spoken of*.

WOT, *house*.      WON, *the house just spoken of*.

YIEP, *tail*.      YIEM, *the tail just spoken of*.

NOTE.—Bagirmi has a similar demonstrative particle -NA—

SINDA, *horse*.      SINDA-NA, *the horse just spoken of*.

### Examples of the suffix -Ń—

#### i. Nubian suffixes -Ń to denote both agents and instruments.

BAŃ-IŃ, *speech*.      WAHĪ-Ń, *foresight*.

FAŃ-IŃ, *hunger*.      FEND-IŃ, *beggar*.

DEŃ-IŃ, *coition*.      MĒ-Ń, *goat*, lit. *bleater*.

NOTE.—Bari uses MEE-TYO, *bleater*, for *goat*—for suffix T-YO see § 31.

#### ii. Bari particularly likes this affix, especially in its adjectives.

DYO-Ń, *dog*, cf. DYA, Mas.; JO, Di.

K-IMA-Ń, *fire*, cf. MĀ-CH, Shl.; MAI, Di.

K-OLO Ń, *sun*, cf. AKOL, Di.

and      FALELE-Ń, *sweet*; MODO-Ń, *old*; GALA-Ń, *broad*; GWŌLO-Ń, *bent*, etc.

#### iii. Masai has numerous instances.

G-ITE-Ń, *cow*.      K-IMA-Ń, *fire*.

G-OLO-Ń, *sun*.      K-IŃA-Ń, *crocodile*.

Suk likes to attach -N to the singular suffix -IA, IO.

ÑOT-IA-N, *maggot.*

KALAL-IA-N, *fly.*

PUT-IO-N, *hair.*

PEL-IO-N, *elephant.*

Nandi has KUTU-Ñ, *knee.* MATA-Ñ, *cheek.*

iv. Shilluk uses it as above.

Dinka has it in such words as BYO-Ñ, *clothes.* DA-Ñ, *bow.*

Identical suffixes appear in Kunama and the Agau (Hamitic) dialects of Khamir and Bilin.

### B.—*Diminutives.*

To express a diminutive, a suffix which is undoubtedly identical with the word *child, small*, is used in many of the languages under consideration.

i. Nubian. -TÖD, KDM. -TENDO, -TONDU, Dair.

BUR-TÖD, KDM., *little girl.*

BU-TÂN, D., BA-TENDO, Dair, *youngster.*

WEL-TÖD, K., *little dog.*

KOR-TONDU, D., *young male.*

KUB-TÖD, K., *little ship.*

ii. Bari. -TOT, -TÖT, -TAT—rarely -AT, -ÖT.

FIOM-TOT, *drop of water.*

KUJÖ-TOT, *grain of sand.*

LE-TAT, *drop of milk.*

KURU-TÖT, *worm.*

GURU-TÖT, *lizard.*

KUFIR-ÖT, *feather.*

NOTE.—This suffix only appears in the singular, and so may perhaps be connected with the suffixes in § 31, case ii., and the Nandi "article," § 24.

iv. Dinka. -TIN, -TINTET, and occasionally TIN-AKAN.

RAN-TIN, RAN-TINTET, *mannikin.*

KUR-TINAKAN, *pebble.*

RYEN-TINTET, *little ship.*

Shilluk TÊN, pl. TONO.

WÔ TÊN, *child*, pl. WÔ TONO (*cf.* BU-TÂN, D., above).

DÂN TÊN, *baby.*

All these suffixes are derived from the stem TINT which appears as—

TOD, KDM., TOT, O.N., pl. TUŊI, *boy, child.*

DIT, Ba., *small.*

DITO, Mas., *girl, child*; pl. DOIYE.

TÊN, Shi., *small.*

TINE, Di., *small.*



C.—*Suffixes meaning "to have."*

Nubian has a whole series of suffixes derived from the verb "to have"—KUAL, Dair, KUN. M., KŌ, KD. This stem is Hamitic and appears in Bilin KUN, Khamir KU, Somali KAN, etc.

- i. KAN-Ē denotes a quality [-Ē, -ĀY is a common Hamitic suffix, seen elsewhere in Nubian, as ILL-Ē, *wheat*, GAL-Ē, *stick*].

Examples :—

DUNUR-KANĒ, *blindness*.      AFFI-KANĒ, *youth*.

NUGUD-KANĒ, *slavery*.      TONJIL-KANĒ, *beauty*.

NOTE.—There is a prefix in Shilluk GIN, Dinka KE-, which is probably connected with the above. Examples :—

GIN DŌCH, *goodness*.      GIN RACH, *evil*.

It may, however, be cognate with Nubian GEN, Bari OWON, *to be*.

- ii. KAT-TI (for KAN-TI), sometimes -ATTI, means one who does a thing frequently [for -TI, see § 19—B]. Examples :—

NABĒ-GATTI, *sinner*.      BOWE-GATTI, *swimmer*.

KAL-KATTI, *glutton*.      JAL-KATTI, *gossip*.

Reinisch ("das personliche furwört," § 159) gives a corresponding Agau suffix—ANTĀ.

- iii. KŌ-L, KŌ, *having, possessing* [for -L = ĀL, Som., see § 19].

AIGA-KŌ, *me-having, my husband*.

BEIA-KŌL, *virgin, one who wears the leather fringe*,

and in numerous place-names as BETTI-KŌL, AMBI-GŌL, JOWI-KŌL, etc.

This appears in Bari as a prefix—

KO-GUDU, *hump-backed*.      KO-MAGOR, *hungry*.

KO-KURE, *thirsty*.      KO-MURI, *feverish*.

(In Barea it is suffixed -KO, -GO—BUR-KO, *strong*, SUR-GO, *black*, etc.)

### § 27.—PLURAL FORMATION.

Three separate methods of distinguishing between the plural and the singular occur in the Nilotic languages.

- i. *Plural formation by change of tone or accent*.—Plural formation by change of tone exists in Shilluk, and may be suspected to exist where languages have the same form for both singular and plural. Such forms indeed occur in all the groups except in Nubian, while Nandi occasionally forms a plural by change of accent, thus MŪREN, *warrior*, pl. MURÉN. Suk often does and sometimes changes the vowel as well.

- ii. *Plural formation by change of vowel within the root itself* occurs in Shilluk and is regular in Dinka. Suk has it in such forms as KUŌUT, *brain*, pl.

KUNŪT. Junker gives one instance in the Dair dialect of Nubian, *ŃUR*, *big*, pl. *ŃUAR*.

Westermann (*S. P.*, p. 48) considers this and the foregoing method of plural formation to be modern and due to foreign influence. But if so, it is remarkable that these methods should occur in Shilluk and Dinka, in other respects the least subject to foreign influence of the Nilotic group; while the method cited below of plural formation by affixes seems quite probably Hamitic.

- iii. *Plural formation by means of affixes.*—This is the most frequent method, and all the languages, except Dinka, employ it and show remarkable agreement in the suffixes used. There are three principal plural suffixes, and in addition at least one suffix for forming the singular from the plural. See the end of § 30 for further remarks as to these.

#### § 28.—THE PLURAL SUFFIX -K.

This, or variants such as -CH, -J, occasionally -KIN, -JIN, occurs in all four groups as below.

- i. Nubian. -GŪ, M. and O.N., CHĪ, -NCHĪ, KD.

TĪ, *cow*, pl. TĪ-GŪ, M.; TĪ-CHĪ, K.; TĪ-NCHI, D.

ANGARĒ, *bedstead*, pl. ANGARĒ-GŪ, M.; ANGARĒ-CHĪ, K.; ANGARĒ-NCHĪ, D.

- ii. Bari. -KI, -JI, -JIN.

GURE, *pigeon*, pl. GURE-KI.

KWARA, *pincers*, pl. KWARA-KI.

CHARET, *judgment*, pl. CHARET-JI. DUFĀ, *leather bag*, pl. DUFĀ-JIN.

- iii. Masai. -K, -AK.

AKWI, *grandfather*, pl. AKWI-AK.

MORUO, *old man*, pl. MORU-AK.

The numerous class with the agential suffix -NI form the plural in -K.

BARNO-NI, *barber*, pl. BARNO-K.

AGILA-NI, *destroyer*, pl. A-GILA-K.

- iv. Shilluk. -K.

PI, *water*, pl. PI-K.

MĀ, *aunt*, pl. ME-K.

JAL, *man*, pl. JO-K.

GIN, *thing*, pl. GI-K.

NOTE 1.—This K or CH is *prefixed* and not *suffixed* to the demonstrative pronouns (and perhaps formerly to the personal also) in Bari and Masai. In Nubian, in the form J, it is inserted between the stem and the personal-ending of the verb, to denote a plural object. See § 4.

NOTE 2.—Masai has a plural suffix -SHI, -SHIN, -SIN, which perhaps recalls an earlier -CHI. If this is so, the Suk and Nandi forms in -s may also claim to trace their pedigree through SH and CH to K. This is the more probable as the affix -K is lacking in those dialects. The alternative, proposed by Meinhof, that they are a variant of the next suffix -T, -TIN, is less likely, as the change T to S is rare in Nilotic languages, *e.g.*, it is unknown in Shilluk.



## § 29.—THE PLURAL SUFFIX -T.

The second common plural suffix is -T, or its variants -AT, -TA, -TU, -DU, etc.

Examples:—

## i. Nubian. -DU, Dair. -RĪ, M., for -DĪ?

BŌL, Dair, *beast*, pl. BŌ-DU.

KOMUL, Dair, *snake*, pl. KOM-DU.

NŌG, M., *house*, pl. NŌG-RĪ.

FAG, M., *goat*, pl. FAG-RĪ.

## ii. Bari. -AT, -ET, -ŌT.

KUŠU, *knee*, pl. KUŠU-AT.

ABURI, *gazelle*, pl. ABURI-ET.

LURU, *hill*, pl. LURU-AT.

YŌBU, *wood*, pl. YŌBU-ŌT.

## iii. Masai. -TO, -TA : -ITE, -ITO : -TIN, -ITIN.

JŌNI, *hide*, pl. JŌNĪ-TO.

AŃ, *kraal*, pl. AŃ-ITE.

SARGE, *blood*, pl. SARGE-TA.

BOO, *herd*, pl. BOO-ITE.

AI, *god*, *sky*, pl. AI-TIN.

APA, *moon*, pl. APA-ITIN,

and in the two words below, there is an apparent case of -RA.

ALASHE, *brother*, pl. ALASHE-RA.

ANASHE, *sister*, pl. ANASHE-RA,

but that the R here once existed in the singular also, is seen from the Bari forms

LU-ŃACHER, *brother*.

K-YACHER, *sister*.

Suk. -TIN.

MU, *belly*, pl. MU-TIN

KUKI, *dog*, pl. KUKI-TIN.

Nandi. -TIN-UA, a compound with another plural form.

LOL, *bag*, pl. LOL-TINUA.

MO, *belly*, pl. MO-TINUA.

## iv. Shilluk.

WI-CH, *head*, pl. WA-T.

TAU, *buttocks*, pl. TĀ-T.

YEI, *boat*, pl. YĀ-T.

YE-CH, *belly*, pl. YE-T.

## § 30.—THE PLURAL SUFFIX -IN.

The third common suffix is -A, -I, -O, which appears to be contracted from -AN, -IN, -ON. Examples from all the groups:—

i. Nubian. WEL, KD., *dog*, pl. WEL-Ī, cf. BOL, Dair, *dog*, pl. BOL-IN.

NEL, KD., *tooth*, pl. NEL-Ī, cf. GIL, Dair, *tooth*, pl. GIL-IN.

Dair has also plural suffixes -I, -IL.

ii. Bari. BAB, *stream*, pl. BAR-A.

GOR, *lance*, pl. GOR-O.

GWAN, *cat*, pl. GWAN-AN.

JUR, *land*, pl. JUR-ON.

TUR, *town*, pl. TUR-ON.

DAŃ, *bow*, pl. DAŃ-IN.

iii. Masai. MAKAT, *salt*, pl. MAKAT-I.

DYA, *dog*, pl. DYA-IN.

KURUK, *crow*, pl. KURUK-I.

ARI, *year*, pl. ARI-N.

Suk. EGH, *bullock*, pl. EGH-IN.

YIT, *ear*, pl. YIT-IN.

Nandi. SESE, *dog*, pl. SESE-N.

IIT, *ear*, pl. IIT-IN.

- iv. Shilluk. AKOL, *drumstick*, pl. AKOL-I. AÑON, *knife*, pl. AÑON-I.  
 KAL, *fence*, pl. KAL-I. AMAT, *stork*, pl. AMAT-I.

These three suffixes -K, -T and -I(N) can be paralleled not only in Barea and Kunama (Barea -KA, -TA : Kunama -I), which are perhaps members of the Nilotic group, but also in the Agau (Hamitic) dialects of Abyssinia (-KÂ, -KAN : -TÎ, -TÊ, -TÂY, -TÂN), while -AN, -IN can be traced as far as Hausa.

Meinhof (*Die Sprachen der Hamiten*) gives for Nama as plural suffixes

Masc. -GU. Fem. -TI. Common -N.

The coincidence is striking, and the origin of these suffixes had probably something to do with class distinctions—such as perhaps men in -K, beasts with -N. But this has practically been lost sight of; e.g. the Masai articles OL masc., EN fem., are appended indifferently to nouns forming their plurals in -K and -T.

### § 31.—FORMATION OF THE SINGULAR FROM THE PLURAL.

Cases occur in all the Nilotic languages of singulars formed from the plural, and these may be divided into two classes. i. Those where the addition of a true singular suffix takes place. ii. Where the so-called singular suffix is perhaps the remains of an "article" of the Nandi type. It is, however, equally open to us to regard the Nandi "article" as a specialised singular suffix. That case i. is a real case and not a variant of case ii. is proved by the existence of the singular suffix and the article together in Nandi.

| Case i.              | Plural.          |               | Singular.        |               |
|----------------------|------------------|---------------|------------------|---------------|
|                      | Without article. | With article. | Without article. | With article. |
| <i>Rats</i> ...      | MUR              | MUR-EK        | MUR-IA           | MUR-IA-T      |
| <i>Elephants</i> ... | PÊL              | PÊL-EK        | PÊL-IO           | PÊL-IO-T      |
| <i>Hairs</i> ...     | SUME             | SUME-K        | SUME-YO          | SUME-YO-T     |

Here the existence of a singular suffix -IA, -IO, independent of the article is clearly proved.

In Suk, this singular suffix receives the substantival suffix in -Ŗ, -N, which has been already dealt with in § 26. Examples:—

ŖOT, *maggots*, sing. ŖOT-IAN.

MIN, *oxhides*, sing. MIN-YON.

SUS, *grasses*, sing. SUS-WON.

In Masai, this suffix is contracted to A, O.

ABUR, *froth*, sing. ABUR-A.

AKIR, *stars*, sing. AKIR-A.

KURT, *caterpillars*, sing. KURT-O.



In Bari, the fuller form -yo reappears.

KATAT, *relatives*, sing. KATAT-YO.

LUSAK (for LUSAT-K), *boys*, sing. LUSAT-YO.

NOTE.—This suffix is perhaps -TYO. Compare OT-TO., Mas. *bone*, pl. OT-K, with Bari K-UYU-TYO, pl. K-UYU, where K is the article.

In Shilluk, the suffix is again contracted to -O.

FAL, *knives*, sing. FAL-O.

GYEN, *hens*, sing. GYEN-O.

Case ii.

Bari, a number of substantives ending in -AT, -ET, -TE, -TI omit these terminations in the plural, *e.g.*—

KUJIR-AT, *corner of the eye*, pl. KUJIR.

KIMUR-TE, *gnat*, pl. KIMUR.

MORIN-ET, *finger*, pl. MORIN.

NOTE.—The verbal nouns in -ET (see § 20) form their plurals regularly by suffixing -JI.

Nubian. In the Dair dialect, some, but not all, of the substantives in -DO, -TO omit that termination in the plural.

ORN-DO, *star*, pl. ORN-IN.

E-DU (EL-DU), *woman*, pl. ÊL-I.

KU-DU (KUL-DU), *hill*, pl. KUL-Î.

All these recall the Nandi article in -DO (see § 24).

It is significant that the agential suffixes given in § 19 (all perhaps cognate with the Shilluk NATE, *man*) and the diminutives in § 26—B (all variants of the root TINT, *child*) disappear in the plurals of the Masai and Bari groups. It seems probable that we have here the origin of the custom of forming the singular from the plural. To words denoting a collective class, or perhaps to old plurals, no longer distinguished adequately from the singular, owing to the dying out of the primitive system of plural formation by vowel-change or musical intonation, selective words meaning a man, a definite kind of man, or an instrument, were added to mark particular individuals of those classes. These words like the Shilluk NATE, *man*, TEN, *child*, were not originally suffixes; as all this happened when the languages were still in the isolative state. Later when they became influenced by Hamitic and the plural suffixes -K, -T, -N were adopted, such words as the above became enclitics, and the Nandi type of article originated.

### § 32. THE GENITIVE CASE.

The distinction of case by inflexion appears to be foreign to the Nilotic languages. The objective was probably identical with the nominative, as it still is in the Masai and Bari groups, while the genitive was expressed "directly" by the simple juxta-

position of the two nouns concerned without any connecting particle. However that may have been, the introduction of the Hamitic genitive particle, as typified by the Ancient Egyptian

ENY, EN, fem. ENY-T, pl. ENY-W,

is now almost universal.

- i. The Nubian group, while occasionally using the direct genitive, has borrowed the particle mentioned above as -N, -IN, or -NA, occasionally reduplicated to -NAN. Examples:—

- i. direct: KAM KURUN, *camel's hump*.  
 ĒN GAR, *mother's son, i.e., brother*.  
 ii. indirect: UR-N DILTI, *hair of the head*.  
 TĪ-NCHĪ-N KUDĒ, *cow's enclosure*.

NOTE.—It is interesting to note here that Nubian has adopted the usage of Galla, Somali, Bedauye and the other Hamitic languages of N.E. Africa<sup>1</sup> in allowing the possessing noun to precede the possessed. Kunama also does this, while among the other suspected relatives of the Nilotic family, Bongo permits both usages, while Kunjara agrees with Nubian. None of the other members of the Nilotic family admit of this, as may be seen below.

- ii and iii. Bari and Masai both express the genitive by a particle, declined for gender, and closely resembling the "article," which is no doubt connected with it.

LO, fem. NA, Bari—LE, fem. E., Masai, thus—

Masai. OL ALEM LE-PAPA, *the sword of father*.

EN DOKI E-'N-GERAI, *the thing of the child*.

Bari. JUR LO BARI, *country of the Bari*.

KADI NA NGUN, *house of God*.

NOTE.—Suk and Nandi possess a genitive particle PA (Suk), AP (Nandi), which recalls a distant parallel—Bedauye -IB, -EB.

- iv. Shilluk. The Hamitic genitive particle may be perhaps traced in the practice, noted by Westermann (*S. P.*, p. 58) of dropping a final vowel o and turning the consonant thus exposed, if a mute, into the corresponding nasal, e.g.—

JĀGO, *chief*—JĀN FŌTE WON, *chief of our country*.

TĒDO, *people*—TĒN FĀN ENI, *people of this village*.

TĀBO, *plate*—TĀM ŠAN, *plate of the girl*.

Dinka follows the same practice, see Reinisch (*S. S. N.*, p. 146).

<sup>1</sup> But other Hamitic languages do not, e.g., Ancient Egyptian, which agrees with Semitic practice—and the rest of the Nilotics as shown above. These all say *the cap of the boy*, while Nubian, Galla, Somali, Bedauye, etc., agree with the Sudan languages and say *the boy's cap*.



## § 33.—THE OBJECTIVE CASES.

The ordinary accusative, in all the groups except Nubian, is identical with the nominative—but occasionally a dative or rather ablative particle is used that recalls the Nubian objective particle -GI, -GA.

- i. Nubian forms both accusative and dative cases by the suffixing of the same particle -GI, KD. and Dair, -GA, M.

BURU-GI KABAR-KI TIR, KD. }  
AS-KA TIRE KABAR-KA, M } *give the girl the bread.*

In the Dair dialect this particle is often omitted, and in that of Midob it does not appear to occur. Barea has a dative suffix -GO, and -KI is a locative and dative suffix in Bagirmi. It is probably Hamitic and connected with the verb "to have" (see § 26—C). It occurs in Saho and 'Agar, two dialects of Eritrea; while in the Western Sudan, Kanuri has an accusative -GA and Hausa a dative -GA.

- ii. Bari has a particle KO, KU prefixed to mean *with*, which is probably identical with the Nubian KŌ-L, KŌ, *having* (see § 26—C).  
iv. Shilluk and Dinka have a particle KI, Shi., KE, Di., meaning *with*, whose use sometimes approaches an objective, e.g.—

A-CHĀM BYEL, *he ate dura*—or

A-CHĀM KI BYEL, *he ate with dura*.

This may represent the origin of the above suffixes.

## § 34.—POSITION OF THE SUBJECT.

As Meinhof would make the position of the subject with regard to the verb one of the deciding factors of the question—Sudanic or Hamitic?—we may note here that in the Masai group the subject comes after the verb (Hamitic fashion), but that in Nubian, Bari, and Shilluk it precedes.

## § 35.—THE NUMERALS.

As in all the languages considered, the original system of numeration was quinary, it is only necessary to consider the first five numerals and the tenth. Tabulated, these appear as—

## (a) One.

- i. Nubian WĒR K.D.M., BER Dair, PIRR Midob.  
ii. Bari TU, but *six* = BU-KĒR, i.e., *five + one*.  
iii. Masai ō-BO, fem. NA-BO, Suk OKOŌ, Nandi AKEŊE.  
iv. Shilluk AKYEL, Dinka TOK, Nuer KEL.

NOTE 1.—Reinisch has pointed out (*S. S. N.*, p. 76) that the Nubian form WĒR and its variants descend from an original GŪR, as is shown by the form GORJ, *six*, for GOR-DIJ from an earlier GŪR-DIJ. With this GŪR the Bari KĒR, Shilluk AKYEL, Nuer KEL are also cognate. Cf. the Hamitic Bedauye GŪAL, GŪAR, *one*.

NOTE 2.—Compare Galla TOKO, Kunjara DIK, Maba TEK (all = *one*) with the Dinka and Bari forms.

## (b) Two.

- i. *Nubian* ŌW-U *KD.*, ŪW-O *M.*, ORA *Dair*, UDDI *Midob.*
- ii. *Bari* ŌRL.
- iii. *Masai* ARE, *Suk* OGHIE-Ń (for OWIE-Ń ?), *Nandi* AE-Ń (for AWE-Ń ?).
- iv. *Shilluk* ARYAU, *Dinka* ROU, *Nuer* ROU.

NOTE.—ŌW, ŪW in *Nubian* are contracted from ORW : probably all the above forms are referable to a similar original. Compare *Bedauye* WORL, WER, *other* ; *second*, *Kunama* BAR-Ē, *two*.

## (c) Three.

- i. *Nubian* TOSK *KD.*, TUSK *M.*, TOY, TOJ *Dair*, TASI *Midob.*
- ii. *Bari* SALA, but *eight* = BU-DÖK, i.e., *five* + *three*.
- iii. *Masai* ŌKUNI, fem. UNI, *Suk* and *Nandi* SOMOK.
- iv. *Shilluk* ADEK, *Dinka* DYAK, *Nuer* DIAK.

NOTE.—The interchange of s (*Nubian*) and y (*Dinka*) is noteworthy.

## (d) Four.

- i. *Nubian* KEMS *KDM.*, KEŃU *Dair*, ĒGI *Midob.*
- ii. *Bari* UŃWAN.
- iii. *Masai* UŃWAN, *Suk* and *Nandi* AŃWAN.
- iv. *Shilluk* AŃWEN, *Dinka* UŃUAN, *Nuer* ŃWAN.

NOTE 1.—Compare the southern *Galla* dialects of *Tambaro* and *Hadiyya*, which have KONSUA, *nine*, with the *Nubian* forms.

NOTE 2.—Cf. *Kunjara* OŃAL, *four*.

## (e) Five.

- i. *Nubian* DLJ *KDM.*, DISHU *Dair*, DĒCHI *Midob.*
- ii. *Bari* KANAT, in compounds BU-
- iii. *Masai* IMYET, *Suk* MŪT, *Nandi* MUT.
- iv. *Shilluk* ABICH, *Dinka* WDYECH, *Nuer* DIECH.

NOTE 1.—*Suk* sometimes, and *Turkana* regularly, use HKAN, cf. *Bari* KAN-AT.

NOTE 2.—*Shilluk* uses ABI-, *Nuer* BE-, in compounds above *five*, thus ABI-KYEL *Shi.* BE-KEL *Nuer*, BU-KĒR *Bari*, *six*.

## (f) Ten.

- i. *Nubian* DIMIN *KD.*, DĪM *M.*, BURE *Dair*, TIMMI *Midob.*
- ii. *Bari* MERE.
- iii. *Masai* and *Suk* TOMON, *Nandi* TAMAN.
- iv. *Shilluk* FYARO, *Dinka* WTYER, *Nandi* OUEL.

NOTE 1.—The majority of these forms are cognate with *Bedauye* TAMIN, *Saho* TAMMĀN, 'Agar TABAN, *Somali* TOBAN, etc.

NOTE 2.—Reinisch has pointed out that the *Dinka* form WTYER stands for WTY (WDYECH), *five* + ER, AR, *two*—see *S. S. N.*, p. 152.



## CONCLUSION.

To recapitulate, after the review of the four language groups set out in the foregoing pages, it seems possible to say that we have here four nearly allied dialects, possibly akin to the Sudan languages, which originally possessed in common the following features :—

- (a) Their phonetic systems did not include *h*, *s*, *sh*, *z*, and preferred *p* to *f*. They probably all made use of musical intonation in inflecting their verbal and substantival roots.
- (b) The verb, and the substantive, consisted of monosyllabic roots consisting of a vowel, or a semi-vowel and a vowel, enclosed by two consonants.
- (c) The verb had no personal-endings and only two tenses—denoting completed and incompleted action respectively.
- (d) The personal pronouns were distinguished from each other by vowel-change and were perhaps originally *ya*, *yi*, *ye*.
- (e) The original demonstrative pronoun (now lost) was a suffix *-ŋ*.
- (f) The interrogative pronouns were perhaps *ŋa* ? *ŋyu*, *what* ?
- (g) The original method of distinguishing number was by vowel-change or musical intonation. Perhaps the method of forming the singular from the plural by a distinctive word, not yet a suffix, like the Shilluk *ŋate*, *man*, dates back to this period.
- (h) There was no distinction for case.
- (i) Many of the verbal and substantival roots, set out in Appendix I, date back to this period.

At a later period, Hamito-Semitic influences, among which one common influence, nearly akin to modern Kafa or Galla, stands chief, permeated three of the groups, Nubian, Bari and Masai, which we may therefore call Niloto-Hamitic, and to a slight extent affected the Shilluk group also. Dinka seems the most primitive of them all. To this Hamitic influence we may ascribe :—

- i. The elaborate tense system of Nubian.
- ii. The extensions of the root-meaning conveyed by :
  - (a) Reduplication.
  - (b) Suffixes, of which some are common to all the Niloto-Hamites, such as
    - 1. *-j*, *-ch*, later *-sh*, reflexive.
    - 2. *-b*, *-d*, intensive.
    - 3. *-ŋ*, *-n*, inchoative or stative.
- iii. The Masai “article,” but not the Nandi one, and the demonstrative pronouns as they exist to-day.
- iv. The plural suffixes *-k*, *-t*, *-i(n)*.
- But v. The Nubian case-endings and the use of the Masai “article” as a genitive particle are due to separate and later Hamitic influences.

As to possible extensions of the Nilotic family, it seems very probable that Barea and Kunama, two dialects spoken on the frontier between the Anglo-Egyptian Sudan and Abyssinia, form another Niloto-Hamitic group. As to this question, see S. L. Reinisch's published grammars of these two languages, and his constant references to their resemblances to Nubian in *Die sprachliche Stellung des Nuba*.

Small vocabularies of Tabi and Gule, two languages from near Roseires on the Blue Nile, have been collected by E. Marno<sup>1</sup> and Mrs. B. Z. Seligman.<sup>2</sup> From these scanty materials it appears possible that these may be Nilotic, since Tabi possesses a plural suffix -K, and a feminine article -NYE; while a certain proportion of Gule words are cognate with Shilluk. See Westermann's *Shilluk People*, p. lvii, for the comparison.

As to the Niloto-Sudanic group, much less is known of the languages in that part of Africa, but it seems possible, from the scanty materials gathered by Schweinfurth, that Bongo belongs to the Shilluk group, and that a link exists with the rest of the Sudan languages through Bagirmi.

Little has unfortunately been published about the languages of the Anglo-Egyptian Sudan in the last forty years, and much yet remains to be done before the full details of the inter-relationships of the Nilotic languages can be worked out.

## APPENDIX I.

## LIST OF COMMON ROOTS.

NOTE.—For the numerals see § 35.

| English.        | Group i.                    | Group ii.        | Group iii.    | Group iv.            | Remarks. |
|-----------------|-----------------------------|------------------|---------------|----------------------|----------|
| Absent ...      | HAI DM. avoid               | BAI-IN Ba. ...   | —             | WAŃO Shi. be lost    |          |
| Abundant, to be | HĒR, BOĒR K.                | —                | BORE Mas. ... | —                    |          |
| Abuse, to ...   | DAŃ K. ...                  | DIK-UN Ba. root  | DEK Mas. ...  | —                    |          |
| Alone ...       | KŌL KDM. ...                | GELE-Ń Ba. ...   | -KE Nan. ...  | AKYEL Shi. one       |          |
| Ant-heap {      | GUĀB M., GŌR KD.            | K-EGBOH Ba.      | —             | WŌRO Shi.            |          |
| Astray, lead    | KUAR Dai. ant<br>FIR M. ... | —<br>MŌR Ba. ... | —             | —<br>BWŌRŌ Shi. err. |          |
| Bad ...         | MILI KD., BELU Dai.         | BELE Ba., greedy | —             | —                    |          |
| Be, to ...      | GEN KDM. ...                | GWON Ba. ...     | —             | GIN Shi. thing       |          |

<sup>1</sup> E. Marno, *Reisen im Gebiet des Weissen und Blauen Nil*. Vienna, 1874.

<sup>2</sup> B. Z. Seligman, *Zeitschrift für Kolonialsprachen*. Berlin, 1912.



## LIST OF COMMON ROOTS—continued.

NOTE.—For the Numerals see § 35.

| English.              | Group i.   | Group ii.                                       | Group iii.  | Group iv.                              | Remarks.   |
|-----------------------|--|---|---|--|--|
| Beat, to              | BADE <i>M.</i> whip  | BUT, GWUT <i>Ba.</i>                            | —   | FODO, FWODO <i>Shi.</i>                |  |
|                       | BOD <i>Dai.</i> strike   | —   | —   | PUOT <i>Di.</i>                        |  |
| Behind, back side     | ABAG <i>DM.</i> ...  | FUN-OT <i>Ba.</i> ...                           | —   | BAÑ <i>Shi.</i> ,<br>AMOG <i>Di.</i>   |  |
| Belly, mind           | TU <i>KDM.</i> ...   | TOW-YLI <i>Ba.</i>                              | TAU <i>Mas.</i> mind  | —                                      | <i>cf.</i> TAU <i>Barea.</i>                               |
| Bird                  | WAY <i>M.</i> , to fly<br><i>cf.</i> KEN-TI<br><i>DM.</i> nest | K-WEN-TI <i>Ba.</i>                             | K-UEN <i>Mas.</i> ...                                       | WIÑO <i>Shi.</i>                       |  |
| Blood (1)             | GEU, GER <i>KD.</i><br>for GERW;<br>OGER <i>Dai.</i> ...       | —   | KWER <i>Suk.</i> ,<br>Nan. bleed,<br>KOR-OT blood           | KYERO <i>Shi.</i><br>bleed             | <i>cf.</i> GOROR <i>Som.</i><br>nose-bleeding              |
| Blood (2)             | URM <i>Dai.</i> to<br>fight                                    | ARIMA <i>Ba.</i> ,<br>REM-BU <i>Ba.</i><br>slay | REM <i>Mas.</i> slay<br>(with a spear)                      | REMO <i>Shi.</i> ,<br>RYAM <i>Di.</i>  |  |
| Blunt                 | MUTTU <i>K.</i> ...  | GWUTU <i>Ba.</i> ...                            | MUTU-S <i>Suk.</i> ...<br>NUTU-M <i>Nan.</i>                | —                                      |  |
| Boil, to              | WAL <i>M.</i> ...  | WALALA <i>Ba.</i> ...                           | —   | WALO <i>Shi.</i>                       |  |
| Bones                 | KOI <i>Dai.</i> ...  | KUYU <i>Ba.</i> ...                             | KOWO <i>Suk.</i> ,<br>Nan.<br>OI-TO <i>Mas.</i> pl.<br>OI-K | —                                      |  |
| Bottom,<br>lower part | BUÑ <i>KD.</i> ...   | WAY-UT <i>Ba.</i>                               | —   | PEN <i>Shi.</i> , PIN<br><i>Di.</i>    |  |
| Bow                   | TUNGU-B <i>DM.</i>   | DAÑ <i>Ba.</i> ...                              | —   | DAÑ <i>Di.</i> ...                     | <i>cf.</i> DAGAN <i>Agau.</i>                              |
| Brain                 | —  | KUÑI-TAT <i>Ba.</i>                             | KUÑUT <i>Suk.</i> ,<br>Nan.                                 | <i>cf.</i> NET <i>Shi.</i>             |  |
| Buy, sell to          | JAN <i>KDM.</i> (for<br>DYAÑ); DIÑ<br><i>Mid.</i>              | —   | IÑAÑ <i>Mas.</i> ...  | —                                      |  |
| Call, cry to          | WUK <i>KDM.</i> ...  | WON <i>Ba.</i> ...                              | {BUAK <i>Mas.</i><br>WARA <i>Nan.</i> a<br>shout            | —                                      |  |
| Call out, to          | TACH <i>M.</i> ...   | TAKU <i>Ba.</i> ...                             | —   | —                                      |  |
| Carried, be ...       | DOG <i>M.</i> ...  | DOGU <i>Ba.</i> carry                           | —   | NAK <i>Di.</i> hang                    |  |
| Catch, to             | DUMM <i>M.</i> ...   | DUM <i>Ba.</i> ...                              | TUM <i>Mas.</i> ...   | DAM <i>Di.</i>                         |  |
| Cease, to             | MUG <i>KDN.</i> ...  | BAKA <i>Ba.</i> ...                             | PAKAK <i>Nan.</i> ...                                       | —                                      | BAQĀ <i>Tigré.</i>   |
| Charcoal              | —  | KUKY <i>Ba.</i> ...                             | GUK <i>Mas.</i> ...   | CHUGO <i>Shi.</i>                      |  |
| Cold; be cool         | OR, OT <i>KDM.</i>   | —   | 'UR <i>Nan.</i> ...   | UIR <i>Di.</i>                         |  |
| Cook, to              | DEU for DERW<br><i>KDM.</i> oven                               | DER <i>Ba.</i> ...                              | YER <i>Mas.</i> boil  | —                                      |  |
| Copulate              | DEÑ <i>KM.</i> DEÑ<br><i>D.</i>                                | DIÑ-A <i>Ba.</i> ...                            | —   | —                                      |  |
| Count, to             | —  | KEN <i>Ba.</i> ...                              | KIEN <i>Mas.</i> ...  | KWENO <i>Shi.</i> ,<br>KWEN <i>Di.</i> |  |
| Country, land         | GÜ <i>KD.</i> , GUB<br><i>M.</i>                               | JUR <i>Ba.</i> ...                              | GOP <i>Mas.</i> ...   | <i>cf.</i> GOBO <i>Shi.</i><br>mud     |  |
| Cow                   | Tİ <i>KDM.</i> , TI<br><i>Dai.</i>                             | K-ITE-S <i>Ba.</i> ...                          | TAIS <i>Suk.</i> ,<br>TA-S <i>Nan.</i>                      | DT <i>Shi.</i>                         |  |
|                       | —  | —   | EN-ITE-S <i>Mas.</i>  | —                                      |  |
| Crocodile,<br>lizard  | NONG-E <i>K.</i> cha-<br>meleon                                | K-IÑO <i>Ba.</i> ...                            | K-IÑA-S <i>Mas.</i>   | ÑAÑ <i>Shi.</i> , <i>Di.</i>           | ÑAÑA <i>Bongo</i> ,<br>N'UKOKO <i>Ba-</i><br><i>girmi.</i> |
|                       | —  | —   | TI-ÑOÑO <i>Nan.</i>   | —                                      |  |

## LIST OF COMMON ROOTS—continued.

NOTE.—For the Numerals see § 35.

| English.            | Group i.   | Group ii.                                 | Group iii.   | Group iv.  | Remarks.   |
|---------------------|--|---|--|--|--|
| Crooked, be         | KOR <i>KD.</i> , KOR-<br>TI corner   | GWÖL-ON <i>Ba.</i><br>be crooked          | SWAL <i>Nar.</i> to<br>bend<br>GUR <i>Mas.</i> to<br>twist<br>GUR-D-IL <i>Mas.</i><br>be crooked | GOR, GOT <i>Shi.</i><br>corner                                 |  |
| Cross <i>subst.</i> | KERE-Ń <i>KD.</i><br>crooked   | GERI <i>Ba.</i> ...                       | —  | AGER <i>Di.</i>  |  |
| Crush<br>grain, to  | JOK <i>KDM.</i><br>grind   | JOK <i>Ba.</i> thrash                     | —  | —  |  |
| Cut, reap,<br>to    | JU millstone<br>JÖR <i>KD.</i> , GÖR<br><i>M.</i>                              | corn JU grind<br>GER <i>Ba.</i> scratch   | —  | GÖR <i>Di.</i> , NOL<br><i>Shi.</i>                            | cf. GOR <i>Som.</i> ,<br>Galla.                            |
| Cry, weep, to       | —  | NER <i>Ba.</i> reap                       | —  | —  |  |
| Deep                | Ö <i>KD.</i> sing ...<br>KUL <i>KDM.</i><br>hole, cave<br>KOL <i>Dai.</i> well | YO <i>Ba.</i> ...<br>GULU <i>Ba.</i> deep | —  | GUOL <i>Di.</i> to dip   | GULU <i>Bagirmi</i> ,<br>and KUL<br>Kanuri cave.           |
| Desire, to          | NER <i>KD.</i> ...   | ŃAR <i>Ba.</i> cave                       | ŃOR <i>Mas.</i> love   | AŃAR <i>Di.</i><br>DYERO <i>Shi.</i><br>DYOM <i>Di.</i>        |  |
| Destroy, to         | JOM <i>K.</i> strike   | —   | —  | —  |  |
| Die, to             | Dİ <i>KDM.</i> ...   | TU <i>Ba.</i> ...                         | TUA <i>Mas.</i> ...  | TOWO <i>Shi.</i> , TOU<br><i>Di.</i>                           | Dİ <i>Barea</i> , TŮ<br>Kun., DŮ<br>Galla,<br>rope Coptic. |
| Dig, to ...         | TOR-Ē <i>M.</i> hoe  | TULU <i>Ba.</i> hoe                       | TUR <i>Mas.</i> ...  | —  |  |
| Dirty, brown        | CHIRI <i>Dai.</i> ...  | CHERE <i>Ba.</i> ...                      | —  | CHOL <i>Di.</i> ,<br>CHİLO <i>Shi.</i>                         |  |
| Dog                 | —  | DIO-Ń <i>Ba.</i> ...                      | DIA <i>Mas.</i> ...  | JO <i>Di.</i> , JO-E<br>Nuer<br>GWO-K <i>Shi.</i>              |  |
| Drum                | K-OLLO <i>MD.</i>  | —   | ŮLUL <i>Mas.</i> ...   | BŮL <i>Shi.</i> ...  | { BALLA <i>Kan.</i><br>Budduma,<br>WALLA <i>Bed.</i>       |
| Dumb                | MUMUT <i>KD.</i>   | —   | KI-MOTU-EK<br><i>Suk.</i>  | MUMO <i>Shi.</i> be<br>confused<br>MIM <i>Di.</i> be<br>silent |  |
| Dura                | MARE <i>KD.</i> ...  | —   | —  | BYEL <i>Shi.</i> , BEL<br><i>Di.</i>                           | A.E. PR-T.   |
| Eat                 | KAB <i>M.</i> , KAM-Ē<br><i>Dai.</i> good                                      | —   | —  | CHAMO <i>Shi.</i> ,<br>CHAM. <i>Di.</i>                        | KAB-ARĀ <i>Barea</i> ,<br>bread, JAM<br>Kunj. Kun.         |
| Enclosure           | ANGI <i>M.</i> ...   | ANG <i>Ba.</i> ...                        | ANG <i>Mas.</i> kraal  | —  |  |
| End                 | KEL <i>KDM.</i><br>limit   | —   | —  | KAL <i>Shi.</i> <i>Di.</i><br>fence                            | OİL <i>Bed.</i> , KELA<br>Kan.                             |
| Enter               | TÖR <i>KDM.</i> <i>Dai.</i>  | DORO <i>Ba.</i> ...                       | —  | DİR <i>Di.</i>   |  |
| Evening             | DİB <i>M.</i> ...  | —   | DEIPA <i>Mas.</i> ...  | —  | DİB <i>Bed.</i> sun-<br>set.                               |
| Eyes; face          | K-ON <i>MD.</i> ,<br>K-ON <i>Dai.</i>  | K-ONĒ <i>Ba.</i> ...                      | EN ON <i>Mas.</i><br>ONĒ-T <i>Lat.</i>   | WAN <i>Shi.</i> ...  | KUNİ Kunj.<br>mitto.                                       |
| Far                 | WARI <i>K.</i> ...   | —   | —  | BĀR <i>Shi.</i> , BAR<br><i>Di.</i>                            |  |
| Fill, to            | JAN <i>DM.</i> (for<br>DYAN)   | YİK <i>Ba.</i> ...                        | —  | YĀNO <i>Shi.</i> ,<br>TYAN <i>Di.</i>                          |  |



## LIST OF COMMON ROOTS—continued.

NOTE—For the Numerals see § 35.

| English.          | Group i.                                  | Group ii.  | Group iii.  | Group iv.  | Remarks.  |
|-------------------|---|--|---|--|---|
| Fire ...          | cf. MASHA <i>M.</i><br>sun                | K-IMA-Ń <i>Ba.</i> ...   | EŃ IMA <i>Mas.</i><br>MA-T <i>Suk.</i><br>Nandi   | MĀ-CH <i>Shi.</i> ,<br>MA-CH <i>Di.</i>                      |   |
| Fish ...          | K-ARĒ <i>KD.</i> ...                      | —  | —   | ER-JO <i>Shi.</i> ,<br>ER-CH <i>Di.</i>                      |   |
| Flay ...          | BOTT <i>KD.</i> ...                       | BÖT <i>Ba.</i> ...   | —   | —  |   |
| Flee, to ...      | MİR <i>M.</i> ...                         | BORA <i>Ba.</i> ...  | BOB <i>Mas.</i> , run<br>over   | FĀRO <i>Sh.</i> , PAR<br><i>Di.</i>                          | FUR <i>Barea.</i>   |
| Forest ...        | —   | —  | TIM <i>Mas.</i><br>TIM-DO <i>Nan.</i>   | TĪM <i>Shi.</i> , TIM<br><i>Di.</i>                          |   |
| Fog ; smoke       | ULU-T <i>KD.</i><br>burning char-<br>coal | FURI-JÖ <i>Ba.</i> to<br>smoke<br>FULÖ-TI burn-<br>ing charcoal<br>KA-FUL-ET fog | FUR-VO <i>Mas.</i><br>smoke<br>KA-FUR-ET<br><i>Suk</i> fog<br>KI-FURI-ENE<br>Nandi fog. | FÖLO <i>Shi.</i><br>cloud<br>FUL <i>Di.</i> light<br>clouds  |   |
| Go, to ...        | JÜR <i>KDM.</i> ,<br>SHUR <i>Dai.</i>     | JÖLO <i>Ba.</i> ...  | CHOR <i>Nan.</i> ...  | CHORO <i>Shi.</i>  |   |
| Go away, to       | REL <i>KD.</i> , PAL<br><i>M.</i>         | WALA <i>Ba.</i> ...  | WEN-D <i>Nan.</i> ...   | WĒLO <i>Sh.</i> , PAL<br><i>Di.</i>                          | A.E. PR.  |
| Good, sweet       | MAS <i>MD.</i> ...                        | BUCH, BUT <i>Ba.</i>   | —   | MAT <i>Shi.</i> , MIT<br><i>Di.</i>                          | PUSA <i>Bagirma</i><br>and MASS <i>Bed</i><br>good luck.                      |
| Granary ...       | GUS-Ē <i>KDM.</i><br>for GUCH-Ē ?         | GUGU <i>Ba.</i> ...  | CHROKE <i>Nan.</i> ...  | GUK <i>Di.</i>   |   |
| Green ; grass     | DESI <i>KDM.</i> ...                      | DETI <i>Ba.</i> ...  | —   | —  |   |
| Hate, to ...      | MÖN <i>KD.</i> ...                        | MAN <i>Ba.</i> ...   | MEN <i>Mas.</i><br>despise<br>MAN <i>Mas.</i> be<br>cruel                               | MĀNO <i>Shi.</i><br>MAN <i>Di.</i>                           |   |
| Hide, bury, to    | BOK <i>KDM.</i>                           | BOK <i>Ba.</i> ...   | —   | —  |   |
| Hippopo-<br>tamus | ERI-T <i>KD.</i> ...                      | YARO <i>Ba.</i> ...  | —   | RAU <i>Shi.</i> , ROU<br><i>Di.</i>                          |   |
| Horse ...         | KACH <i>KD.</i> ...                       | KAINĒ <i>Ba.</i> for<br>KAŃĒ   | —   | KYEŃ <i>Shi.</i><br>(A-KAJ-A<br><i>Dyur</i> )                |   |
| House, kraal      | KĀ <i>KD.</i> ...                         | KADI <i>Ba.</i> ...  | KA <i>Suk.</i> , <i>Nan.</i>  | —  | OÖ <i>Kun.</i> dwell<br>cf. K'ĒYA <i>Am-</i><br>haric, GUAY<br><i>Khamir.</i> |
| House, tent       | NÖG <i>M.</i> ...                         | NAK <i>Ba.</i> ...   | —   | LUĀK <i>Di.</i>  |   |
| Hear, to ...      | —   | YIN <i>Ba.</i> ...   | NIŃ <i>Mas.</i> ...   | LIN <i>Shi.</i>  |   |
| Jug, pitcher      | GUB-Ē <i>M.</i> ...                       | CHAF-E <i>Ba.</i> ...  | SEPE-T <i>Nan.</i> ...  | —  |   |
| Kill, cut off     | DIŃ <i>M.</i> ...                         | DUN <i>Ba.</i> ...   | DUN <i>Mas.</i> ...   | { DEN <i>Shi.</i> vex<br>DUON <i>Di.</i><br>CHUŃ <i>Shi.</i> |   |
| Knee ...          | —   | KUŃU <i>Ba.</i> ...  | GUŃU <i>Mas.</i> ...  | —  |   |
| Left hand ...     | KONDON <i>M.</i> ...                      | KADOŃĒ <i>Ba.</i> ...  | KEDYAŃĒ <i>Mas.</i>   | —  |   |
| Leopard ...       | kō <i>KDM.</i> KVA<br><i>Dai.</i>         | KWARU <i>Ba.</i> ...   | UWARU <i>Mas.</i> ...   | KWACH <i>Di.</i> , <i>Shi.</i>                               |   |
| Little ; child    | TÖD <i>KDM.</i> pl.<br>TUŃI               | DIT <i>Ba.</i> ...   | DITO <i>Mas.</i> pl.<br>DOIYE   | TĒN <i>Shi.</i> pl.<br>TONO<br>TINE <i>Di.</i> ...           | TATA <i>Kan.</i> ,<br>DĒDA <i>Kun.</i><br>TIN <i>Galla.</i>                   |
| Long, high ...    | DŪ-L <i>K.</i> ...                        | DU <i>Ba.</i> ...  | DU <i>Mas.</i> ...  | —  |   |
| Look for, to      | GUŃ <i>M.</i> ; GAŃ<br><i>D.</i> taste    | GAYU <i>Ba.</i> ...  | —   | GAŃ <i>D.</i> touch<br>lightly                               |   |

## LIST OF COMMON ROOTS—continued.

NOTE.—For the Numerals see § 35.

| English.             | Group i.                             | Group ii.                        | Group iii.  | Group iv.   | Remarks.  |
|----------------------|--------------------------------------|----------------------------------|---|---|---|
| Loosen ;<br>drift to | NAK <i>DM.</i> drift                 | LAK <i>Ba.</i> ...               | LAK <i>Mas.</i> ...                                     | LOK <i>Di.</i> drift                                    |   |
| Measure out,<br>to   | TĒM <i>M.</i> break<br>off           | TEM <i>Ba.</i> ...               | TEM <i>Mas.</i> ...                                     | TĒM <i>Di.</i> ...                                      | TIMME <i>Zag-</i><br><i>hawa.</i>   |
| Marry, to ...        | —                                    | YEMA <i>Ba.</i> ...              | IYAM <i>Mas.</i> ...                                    | NŌMO <i>Shi.</i>  |   |
| Master,<br>father    | —                                    | MOŊE <i>Ba.</i> ...              | MEŊE <i>Mas.</i> ...                                    | MAŊO <i>Shi.</i> cap-<br>ture                           | Cf. MEŊE <i>Sua-</i><br><i>hili</i> owdet.  |
| Meat ; flesh         | ARICH <i>M.</i> ...                  | —                                | EŊ IRINO <i>Mas.</i>                                    | RIŊO <i>Shi.</i> RIŊ<br><i>Di.</i>                      |   |
| Mew, to ...          | ŊAU <i>KDM.</i> ...                  | —                                | ŊAU <i>Mas.</i> cat                                     | ŊAU <i>Shi.</i> ; A-<br>ŊAU <i>Di.</i> cat.             |   |
| Milk...              | ICH <i>KD.</i> ...                   | —                                | CHĒ <i>Suk, Nan.</i>                                    | CHĀ-K <i>Shi.</i> , CHA<br><i>Di.</i>                   |   |
| Moon ...             | —                                    | YAFĀ <i>Ba.</i> ...              | APA <i>Mas.</i> ...                                     | PEY <i>Di.</i> ...                                      | { ABĀ <i>Bilin,</i><br><i>Khamir</i><br>cf. NAF<br><i>Bagirmi.</i><br>HOYO <i>Som.</i> ,<br>HIYO <i>Bed.</i> ,<br>EŊA <i>Kwara,</i><br>INA <i>Bilin,</i><br>IYA <i>Hausa,</i><br>YA <i>Kan.</i> |
| Mother, my           | IYO <i>K. Dai.</i><br><i>Mid.</i>    | YA-ŊO <i>Ba.</i> ...             | YĒYO <i>Mas.</i> IYU<br><i>Suk, HIYO</i><br><i>Nan.</i> | —   |   |
| Mother ...           | cf. INDĪ <i>KD.</i> ...              | ŊOTE <i>Ba.</i> ...              | ŊOTO <i>Mas.</i> ...                                    | ŊUOT <i>Di.</i><br>woman                                |   |
| Mouldy ...           | BUGBUG-Ē <i>K.</i><br>salty ground   | BUGI <i>Ba.</i> ...              | —   | BUK <i>Di.</i>  |   |
| Mouth ...            | —                                    | K-UTUK <i>Ba.</i> ...            | EŊ-UTUK <i>Mas.</i>                                     | DOK <i>Shi.</i> ,<br>WTOCH <i>Di.</i>                   |   |
| Name ...             | ERI <i>KD.</i> , OR<br><i>Dai.</i>   | K-AE-Ŋ <i>Ba.</i> ...            | EŊ AE-Ŋ <i>Mas.</i>                                     | RI-Ŋ <i>Di.</i> ...                                     | RN <i>A.E. and</i><br><i>ERAI Som., III</i><br><i>Bagirmi.</i>  |
| Near, to be          | ŊIG <i>K. (for</i><br><i>DYIN ?)</i> | DINGŊ <i>Ba.</i> ...             | DANA <i>Mas.</i> ...                                    | —   |   |
| Neck ...             | —                                    | MURUT <i>Ba.</i> ...             | MURT <i>Mas.</i> ...                                    | MUTO <i>Shi.</i>  |   |
| Night ...            | AWAR <i>M.</i> ...                   | K-WAJE <i>Ba.</i> ...            | EŊ EWARIE<br><i>Mas.</i>                                | UWAR <i>Shi.</i>  |   |
| Nose ...             | —                                    | K-UME <i>Ba.</i> ...             | EŊ UME <i>Mas.</i>                                      | WUM <i>Shi.</i> , UM<br><i>Di.</i> , HUM<br><i>Dyur</i> | Cf. HOMO<br><i>Bongo.</i>   |
| Oath, take an        | JOR <i>M.</i> ...                    | CHAR <i>Ba.</i> give<br>sentence | —   | —   |   |
| Open, to ...         | GAL <i>M.</i> ...                    | ŊAN <i>Ba.</i> ...               | ŊAŊ <i>Suk, Nan.</i><br>uncover                         | —   |   |
| Penis {              | GILLID <i>KM.</i> }                  | —                                | —   | CHUL <i>Shi., Di.</i>                                   |   |
| Pigeon ...           | HILLI <i>Dai.</i> }                  | —                                | —   | —   |   |
|                      | KURU <i>KD.</i> ...                  | GURE <i>Ba.</i> ...              | AKURI <i>Turk.</i> ...                                  | AKUR <i>Shi.</i> ,<br>KURE <i>Di.</i>                   |   |
| Pillow,<br>wooden    | ŊIGIT <i>K.</i> ...                  | TIKET <i>Ba.</i> ...             | —   | —   |   |
| Pot ...              | TURU <i>Dai.</i> ...                 | TULU <i>Ba.</i> ...              | TUL-ET <i>Mas.</i><br>ground                            | —   | { TULU <i>Bagirmi</i><br>TEN <i>Barea</i><br>cooking pot.<br>Cf. BAQ <i>Galla.</i>  |
| Pour, to ...         | BOG <i>KD.</i> , FOG<br><i>M.</i>    | BUK <i>Ba.</i> ...               | IFUK <i>Mas.</i> ...                                    | BYOK <i>Di.</i> ...                                     |   |



## LIST OF COMMON ROOTS—continued.

NOTE.—For the Numerals see § 35.

| English.         | Group i.              | Group ii.           | Group iii.            | Group iv.                | Remarks.   |
|------------------|-----------------------|---------------------|-----------------------|--------------------------|--|
| Pray ...         | BEN-D D.              | WAN, WAN-D Ba.      | —                     | —                        |  |
| Rain; to rain    | ABU K., AWU M.        | RU Ba. to water     | ARE Mas., BOB Nan.    | —                        | ROB Som., BUA Hausa.                                       |
| Raise, to ...    | DUK KDM.              | DOK Ba.             | —                     | —                        |  |
| Raven, crow      | KÔG KDM.              | KORÛK Ba.           | KURUK Mas., KWÔG Nan. | AGAK Shi., GAK Di.       | GAKI Bongo.  |
| Reach, to ...    | DÛR K.                | DUR Ba.             | —                     | DUER, DÛR Di. be near    |  |
| Red; coloured    | GÊL KD.               | KIRI Ba.            | KEHI Mas.             | KWÂRO Shi.               |  |
| Rib ...          | BERI KD.              | MERE-TE Ba.         | —                     | —                        |  |
| Rob, to ...      | —                     | KOLA Ba.            | —                     | { KWÂLO Shi.<br>KWAL Di. |  |
| Scourge, to      | TUK K.                | TÔK Ba. cut, peck   | —                     | —                        |  |
| Scratch, to ...  | BAR-J MD.             | FURI Ba.            | BOR Mas. tear         | FUR-O Shi. to hoe        |  |
| See, to ...      | NAL KDM. NAL O.N.     | —                   | —                     | NENO Shi.                |  |
| Seize, steal, to | MÂG KD.               | MOK Ba.             | —                     | { MÂGO Shi.<br>MWOK Di.  |  |
| Send, to ...     | ISHIN K.              | CHON Ba.            | —                     | —                        |  |
| Share, to ...    | BAG KD., FAG M.       | —                   | —                     | { FÂNO Shi.<br>BAÑ Di.   | FAK Kun. Saho, 'Afar, FEEKIK Bed. etc. A.E. KEN-T.         |
| Ship...          | KUB(L) K.             | KIBO Ba.            | —                     | —                        |  |
| Sleep, to ...    | NALU KD.              | —                   | —                     | { NÊNÔ Shi.<br>NIN Di.   |  |
| Smear, to ...    | IBIR K.               | BOBO Ba.            | —                     | WÂRO Shi.                |  |
| Smoke ...        | TULLI M.              | —                   | —                     | TÔL Di.                  |  |
| Snore, to ...    | KORE KD.              | GOR Ba.             | GOR Mas.              | —                        |  |
| Some, a little   | KID M.                | CHIT Ba.            | KITI Mas.             | —                        |  |
| Son ...          | GAR M., NAL O.N.      | ÑÔRO Ba.            | GHRAT Mas.            | —                        |  |
| Split, to ...    | KAG KDM.              | KAGU Ba.            | —                     | KÂG-O Shi.               |  |
| Stone, hill ...  | KULU KD., KID M.      | KODU Ba.            | —                     | KIT Shi., KUR Di.        |  |
| Stream, canal    | MAR-TI KD.            | BAB Ba.             | —                     | BAB-ICH Di. lake         | MR A.E.  |
| Strike, break    | TÔG KDM.              | TOK Ba.             | Cf. IDUNG Mas.        | TOK Shi., Di ...         | { TAQA Ge'ez,<br>TAQ Saho,<br>TUKU Bagirmi,<br>DUKA Hausa. |
| Strong ...       | KULU-M M.             | GOL-ET Ba. strength | GOL Mas. be s.        | —                        |  |
| Suck, to; breast | OG KDM.               | NÔGU Ba.            | GOÔ Mas. breast       | —                        | ENGUA Kicara, etc.   |
| Swell, to        | BEL KD.               | WEL Ba.             | —                     | —                        |  |
| Sword ...        | SIWID KD., SIBIT Dai. | —                   | SIFIL Mas. blade      | —                        | SIBILA Galla steel   |
| Tail ...         | ÊW KD., IB Dai.       | —                   | —                     | YIEP Shi.                | IB Bagirmi.  |

## LIST OF COMMON ROOTS—continued.

NOTE.—For the Numerals see § 35.

| English.               | Group i.   | Group ii.                                      | Group iii.   | Group iv.  | Remarks.  |
|------------------------|--|--|--|--|---|
| Take, bring...         | AB <i>KD.</i> , AF <i>M.</i>                       | KOB <i>Ba.</i> ...                             | —  | KABO <i>Shi.</i> , KAF <i>Di.</i>                        | GAB <i>Bilin</i> , KAB <i>Saho</i> , 'Afar.   |
| Talk, to ...           | JĀL <i>KDM.</i> ...                                | KUL-YA <i>Ba.</i> ...                          | —  | CHOL <i>Di.</i> ,<br>CHWOT <i>Shi.</i>                   | —   |
| Tear, to ...           | GIN-D-Ē <i>M.</i><br>thorn                         | GIN-DYA <i>Ba.</i> ...                         | GLI (GIDY-) <i>Mas.</i>  | —  | KIŃO <i>Bongo</i><br>thorn.   |
| Tickle, to             | KILKIL <i>KM.</i> ...                              | KUKUDI <i>Ba.</i> ...                          | { IKITIKIT <i>Mas.</i><br>KITKIT <i>Nan.</i>                                     | —  | KILLIKILLĀ<br><i>Kun.</i> , KILKIL<br><i>Bed.</i>   |
| Time, until...         | -TĀG <i>K.</i> , -TĀN<br><i>M.</i> , until         | DIŃ-IT <i>Ba.</i> ,<br>TE-Ń until              | —  | CHAŃ <i>Shi.</i> ,<br>CHYEŃ <i>Di.</i>                   | —   |
| Thin, short...         | —  | CHOK <i>Ba.</i> ...                            | —  | CHYEK <i>Shi.</i> , <i>Di.</i>                           | —   |
| Throw away,<br>destroy | ARK <i>KD.</i> ...                                 | RYOK <i>Ba.</i> throw<br>down, RYAK<br>destroy | BEK <i>Mas.</i> ...  | RYAK <i>Di.</i> de-<br>stroy, RYAK<br><i>Shi.</i> famine | —   |
| Tongue ...             | JAB <i>K.</i> taste,<br>feel                       | NE-DEB <i>Ba.</i> ...                          | { NE-DYEF <i>Mas.</i><br>NE-LYEF <i>Nan.</i>                                     | LEP <i>Shi.</i> ,<br>LYEF <i>Di.</i>                     | —   |
| Tooth ...              | NEL <i>KD.</i> , GIL<br><i>Dai.</i> for NEL        | K-ELE <i>Ba.</i> ...                           | { ALA <i>Mas.</i> ...<br>KEL-DA <i>Nan.</i><br>KEL-AT <i>Suk.</i>                | LE-JO <i>Shi.</i>  | KULE, KURE<br><i>Bed.</i>   |
| Tremble, to            | KERKER <i>KDM.</i>                                 | GHIŃRIŃ <i>Ba.</i><br>earthquake               | IKIRIKIR <i>Mas.</i>   | KIRO <i>Shi.</i> ...                                     | KRKE <i>A.E.</i> and<br>QALQAL <i>Ara-</i><br><i>bic.</i>                                     |
| Turtle ...             | DERI <i>D.</i> for<br>DYER (?)                     | ŃYER <i>Ba.</i> ...                            | —  | NYER <i>Di.</i>  | —   |
| Urine ...              | —  | LODE <i>Ba.</i> ...                            | ALAK <i>Mas.</i> ...   | LACHO <i>Shi.</i> ,<br>LACH <i>Di.</i>                   | —   |
| Watercourse            | JER <i>K.</i> , SER <i>Dai.</i>                    | JOR <i>Ba.</i> pond...                         | JORO <i>Mas.</i><br>spring, IAR-<br>ATA valley                                   | —  | ZAR-Ā <i>Saho</i> ,<br>ZAR <i>Khamir.</i>   |
| Watering-<br>place     | ARE <i>KD.</i> ,<br>waterfall                      | K-ARE <i>Ba.</i> river                         | ARE <i>Mas.</i> ...  | —  | —   |
| Way, road ...          | GIE <i>KD.</i> ...                                 | GÖE <i>Ba.</i> ...                             | —  | KUER <i>Di.</i> ...                                      | KARĀ <i>Galla.</i>  |
| Weave, to ...          | AWIJ <i>KD.</i> ...                                | WIWI-JÖ <i>Ba.</i> ...                         | —  | —  | —   |
| Well, be ...           | WAIYI <i>KM.</i> ...                               | BIA-JU <i>Ba.</i> ,<br>WAYU be<br>courageous   | BI <i>Mas.</i> be<br>strong, WEI<br><i>Nan.</i> well, M-<br>WEIY <i>Mas.</i> ill | —  | M-WEYO <i>Bagir-</i><br><i>mi ill.</i>  |
| Wet, wash ...          | JAWWA-R <i>M.</i><br>wet, JAU <i>K.</i><br>to wash | JAWE <i>Ba.</i><br>rainy season                | —  | CHAU <i>Di.</i> to<br>wash                               | —   |
| Wing, feather          | AWIR <i>M.</i> , ABIR<br><i>K.</i>                 | K-UPIR <i>Ba.</i> ...                          | OPIR, OBIR <i>Mas.</i>   | OBĒR <i>Shi.</i> ...                                     | AN-BIR <i>Be-</i><br><i>dauye, from</i><br>BIT to fly.<br><i>Of. SANA-T</i><br><i>Arabic.</i> |
| Year ...               | JEN <i>KDM.</i> ,<br>SHIŃ <i>Dai.</i>              | KIŃA <i>Ba.</i> ...                            | KEŃ <i>Nan.</i> ,<br>KAIŃ <i>Suk</i>   | —  | —   |



## APPENDIX II.

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## RELATIONSHIPS AMONG THE WAYAO.

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*Introductory.*—Various writers have attempted to give English equivalents to the Yao terms describing relationship, or have alluded to the outstanding features of the system, but I am not aware that anybody has hitherto worked out the whole system.

Although it is very similar to other classificatory systems, I feel that a description of it may not be quite valueless, more especially on account of the evolutionary changes that are taking place.

The WaYao are a Bantu tribe, exogamous but not totemic, which until the middle of the last century inhabited that part of Central Africa lying to the East of Lake Nyasa, particularly in the valleys of the Lujenda and Rovuma rivers. Up to that time the tribe had not extended far from the area indicated except perhaps in a northerly direction, but owing to constant internecine war in their own territory the Yaos then invaded and conquered a large part of the neighbouring territories, especially to the south, in what is now called Nyasaland.

I have said that the WaYao are not totemic, and that statement is correct at the present time. Opinions differ, however, as to how recent their loss of totemism is; though their initiation ceremonies are generally regarded as totemic, even there, in my opinion, the evidence is not conclusive, and there remains no suspicion of totemism outside these ceremonies.

It should be mentioned that Islam is much more prevalent among the Yaos than among their neighbours, but its influence is not yet so deep-rooted as greatly to obscure the pure tribal customs, except to a certain extent among the rising generation.

To facilitate description the relationships are given in tabular form, the relationship being given with reference to one man or woman.

In Table I, Column 1 describes the relationship, Column 2 gives either the nearest equivalent of the Yao term, or, if none, the actual terms. Columns 3-9 give the various relations of the person named in Column 1, as they would be named by the man or woman under consideration.

For example, the brother of (a)'s father (Column 1) is regarded as (a)'s father (Column 2), the wife of (a)'s father's brother is (a)'s *akwego* (Column 3), their child is his "brother" or "sister" (Column 4), and so on (see Table I).



In Table II, the relationships mentioned in Column 1 are defined in Columns 2-9.

Thus a brother (of (a)) is, *inter alia*, the son of (a)'s father's brother (Column 3), the husband of the daughter of (a)'s father's sister (Column 4), and so on (see Table II).

Before the tables can be fully intelligible, however, a brief explanation of terms having no English equivalent is necessary:—

(a) *Akwego* and *Alamu* are terms exclusively given to relations by marriage.

*Alamu* is a brother or sister by marriage—it is not advisable to use the terms “brother-in-law” or “sister-in-law” as they are too circumscribed.

*Akwego* has not even an approximate equivalent in English owing to the diversity of relationships included (*e.g.*, wife's mother and great-granddaughter's husband).

*Msiéani* is a special term given to the children of a paternal aunt or maternal uncle, to distinguish them from those of a paternal uncle or maternal aunt.

*Asiéani* are not only allowed to marry but are encouraged to do so.

*Akwelume* is used only for a maternal uncle, and *chipwa* is the reciprocal term for a sister's son.

The use of inverted commas with English terms (*e.g.*, “brother”) indicates that the person is regarded by the Yao as being of the same relation to him as the term usually signifies in English. Thus a Yao regards the son of his maternal aunt, for instance, as being exactly the same relation as his own brother (by the same parents); this relationship is indicated as “brother.”

*Succession.*—The common rule of discriminating between the children of a brother and sister and those of two brothers or of two sisters is present here, and is combined with the equally common one of succession to the sister's son.

The rule of succession is, strictly speaking, to the eldest son of the eldest sister. If, however, a man and his advisers consider him to be unsuitable, or in event of his death, the succession passes to the following in order of precedence: younger son of the eldest sister, younger son of a younger sister, and son of own daughter.

Only by general consent can the succession pass elsewhere, but it not infrequently happens that intrigue procures the death of all the legal heirs of a wealthy or powerful man. In such cases, but only by general consent, the succession may pass to a brother (by the same mother), any “son,” or even to a powerful vassal; it is often felt that a wealthy or influential man is likely to conduce to the peace and welfare of the country rather as the chief, than as a probably turbulent vassal of a man whose succession is apt to be controversial. On the death of such a man, however, matters are often in a state of chaos owing to the multitude of claimants, the members of the two families; I have known two such cases. A man, also, who

TABLE I.—*Showing the Yao relationships of one person.*

| 1.                                   | 2.                | 3.                               | 4.                     | 5.                                       | 6.                          | 7.  | 8.                                | 9.  |
|--------------------------------------|-------------------|----------------------------------|------------------------|--|-----------------------------|---|-----------------------------------|---|
| English Relationship.                | Yao Relationship. | Relationship of Wife or Husband. | Relationship of Child. | Relationship of Child's Wife or Husband. | Relationship of Grandchild. | Relationship of Grandchild's Wife or Husband. | Relationship of Great-Grandchild. | Relationship of Great-Grandchild's Wife or Husband. |
| Own father.                          | Father            | Mother                           | Brother or sister      | Alamu                                    | Child                       | Akego   | Grandchild                        | Akego   |
| Own father's brother                 | Father            | Akego                            | Brother or sister      | Alamu                                    |                             |   |                                   |   |
| Own father's sister                  | Father            | Akego                            | Brother or sister      | Brother or sister                        |                             |   |                                   |   |
| Own mother                           | Mother            | Father                           | Brother or sister      | Alamu                                    | Child                       | Akego   | Grandchild                        | Akego   |
| Own mother's brother                 | Akelame           | Akego                            | Brother or sister      | Brother or sister                        |                             |   |                                   |   |
| Own mother's sister                  | Mother            | Father                           | Brother or sister      | Alamu                                    |                             |   |                                   |   |
| Husband or wife's father             | Akego             | Akego                            | Alamu                  | Brother or sister                        | Grandchild                  | Akego   | Grandchild                        | Akego   |
| Husband or wife's father's brother   | (father)          | Akego                            | Alamu                  | Brother or sister                        |                             |   |                                   |   |
| Husband or wife's father's sister    | (father)          | Akego                            | Brother or sister      | Alamu                                    |                             |   |                                   |   |
| Husband or wife's mother             | (father)          | Akego                            | Alamu                  | Brother or sister                        | Grandchild                  | Akego   | Grandchild                        | Akego   |
| Husband or wife's mother's brother   | Akego             | (father)                         | Brother or sister      | Brother or sister                        |                             |   |                                   |   |
| Husband or wife's mother's sister    | (father)          | Akego                            | Alamu                  | Brother or sister                        |                             |   |                                   |   |
| Brother's wife's brother             | Alamu             | (father)                         | Child                  | Akego                                    | Grandchild                  | Akego   | Grandchild                        | Akego   |
| Sister's husband's brother           | Alamu             | Brother or sister                | Child                  | Akego                                    |                             |   |                                   |   |
| Brother's or wife's brother          | Brother or sister | Alamu                            | Child                  | Akego                                    |                             |   |                                   |   |
| Husband's or wife's sister           | Brother or sister | Alamu                            | Child                  | Akego                                    | Grandchild                  | Akego   | Grandchild                        | Akego   |
| Husband's or wife's sister's brother | Brother or sister | Alamu                            | Child                  | Akego                                    |                             |   |                                   |   |
| Husband's or wife's sister's sister  | Child             | Akego                            | Grandchild             | Akego                                    |                             |   |                                   |   |
| Own child                            | Child             | Akego                            | Grandchild             | Akego                                    |                             |   |                                   |   |

<sup>1</sup> Including son or daughter of maternal aunt or paternal uncle.



TABLE II.—*Defining Yao terms of relationship.*

| 1.         | 2.   | 3.  | 4.  | 5.   | 6.   | 7.   | 8.                     | 9.                |
|------------|--|---|---|--|--|--|------------------------|-------------------|
| Yao Term.  | Own Father's<br>or Mother's  | Father's<br>Brother's   | Father's<br>Sister's  | Mother's<br>Brother's  | Mother's<br>Sister's   | Wife's or<br>Husband's   | Son's or<br>Daughter's | Grand-<br>child's |
| Brother "  | (a) Son ....<br>(b) Husband of<br>(a)'s wife's<br>" sister "       | (a) Son ....<br>(b) Husband of<br>(a)'s wife's<br>" sister "  | (a) Husband of<br>daughter<br>(b) Husband of<br>(a)'s " sister "      | (a) Husband of<br>daughter<br>(b) Husband of<br>(a)'s " sister " | (a) Son ....<br>(b) Husband of<br>(a)'s wife's<br>" sister "       | (a) Male <i>Asiucani</i><br>(b) Husband of<br>" sister "<br>(c) " Brother's " wife's " brother "<br>(d) " Sister's " husband's " brother "                     | —                      | —                 |
| " Sister " | (a) Daughter ....<br>(b) Wife of (a)'s<br>husband's<br>" brother " | (a) Daughter<br>(b) Wife of (a)'s<br>husband's<br>" brother " | (a) Wife of son ....<br>(b) Wife of (a)'s<br>husband's<br>" brother " | (a) Wife of son ....<br>(b) Wife of (a)'s<br>" brother "         | (a) Daughter ....<br>(b) Wife of (a)'s<br>husband's<br>" brother " | (a) Female <i>Asiucani</i><br>(b) Wife of " brother "<br>(c) Brother's wife's<br>" sister "<br>(d) Sister's husband's<br>" sister "                            | —                      | —                 |
| " Father " | " Sister " (of<br>own father)                                      | " Brother "<br>—  | (a) " Brother "<br>(b) Husband  | —  | Husband  | (By courtesy)<br>(a) Father<br>(b) Father's brother<br>(c) Father's sister<br>(d) Husband of (c)<br>(e) Husband of<br>mother's sister<br>(v. <i>atsucago</i> ) | —                      | —                 |
| " Mother " | " Sister " (of<br>own mother)                                      | —   | —   | " Sister " ....  | " Sister " ....  | —  | —                      | —                 |

| <i>Alamu</i>        | (a) Husband of daughter<br>(b) Wife of son  | (a) Wife of son.<br>(b) Husband of daughter<br>(c) "Brothers" and "sisters" of (a) and (b) | —          | —          | (a) Wife of son.<br>(b) Husband of daughter<br>(c) "Brothers" and "sisters" of (a) and (b) | (a) "Brother"<br>(b) (a)'s wife's brother's wife<br>(c) (a)'s wife's "aunt's" husband<br>(d) "Sister"<br>(e) (d)'s husband's "brother's" wife<br>(f) (d)'s husband's "sister's" husband                              | —               | — | Husband or wife |
|---------------------|---|--|------------|------------|--|--|-----------------|---|-----------------|
| <i>Akwopo</i>       | Husband or wife of a child of a "brother" or "sister" of the wife or husband of son or daughter | —  | Wife       | —          | —  | (a) "Father" and "mother"<br>(b) Paternal uncles and aunts<br>(c) Wives of uncles<br>(d) Husband of mother's sister<br>(e) Husband or wife of child of a "brother" or "sister"<br>(f) Husband or wife of (e)'s child | Husband or wife | — | Husband or wife |
| "Son" or "Daughter" | (a) Grandchild of child's wife's or husband's "brother" or "sister"                             | Grandchild   | Grandchild | Grandchild | Grandchild   | "Son" or "daughter"  | —               | — | —               |



knows that he is not legally justified in "entering into the name" is loath to do so, as he knows that he is not expected to make a successful chief. The defeat of Salimu, the fifth Makanjila, by the British in 1893 was, and still is, ascribed to the fact that he belonged to the male line.

The term *chipica* (*mwipwagwao*, "his *chipica*") may be used for any child of a sister. A female title (common amongst the Yaos) descends to the eldest daughter of the eldest son of the bearer of the title.

*Marriage.*—Relatives who are forbidden to marry are called *achiwawako*; they include all those given in the table except *asiwani*, *achiwesukulu* ("grandchildren"), and the wife of the maternal uncle. An heir, on succeeding, may marry the wife or wives of his maternal uncle, but not if he has previously married one of his daughters.

It is legal, though rare, for a man to marry the daughter of his own child (*chisukulu*).

"*Brothers*" and "*Sisters*."—The term *ulongo* is used to describe an exogamous clan, and the members are known as *mlongo* (singular)—*achalongo* or *ia chilongo*, collectively. This word *mlongo* is probably a corruption of *mu ulongo* ("in the clan") as it requires the use of the term *mjakwe* (*ajao*) "a companion," instead of the possessive pronoun. Thus *mlongo mjakwe* (*achilongo ajao*), "his (their) clan relatives" (instead of *mlongo juakwe*, *achalongo wao*).

There is no general term corresponding to the English "brother." The nearest is *mlumbu*, which describes the relationship between a "brother" and a "sister," it is rarely used by women, however.

The elder "brother" of a man is called *akulu* or *achimwene*. These terms are used for all sons of a father's elder "brother" or of a mother's elder "sister," and for the elder brother by the same parents. They are also used by a woman for any "brothers," older or younger, senior or junior, in preference to the term *alumbu*.

*Mpncanga* is used for a son of a father's younger "brother" or of a mother's younger "sister," and for a younger brother by the same parents. It is used by a woman for her "sisters" in exactly the same way, but is never used by a woman of a man.

A man calls his "sister" *chemwali*, collectively, *mwanjawo chemwali*; a girl refers to an elder, or senior "sister," by means of the same term; a man refers to a "sister" as *alumbucangu* or as *chemwali*.

The term *chisukulu* is used for a "grandchild" (*mwisukuluwangu*, "my 'grandchild'").

"*Father*" and "*Mother*."—A paternal aunt is distinguished as *atati wakongwe* ("female father") if necessary, though she is, of course, not addressed as such. The elder brother of a father is referred to as *atati wakulungwa* ("the great father"), his younger brother as *atati wanandi* ("the little father"). Other *achatati* are similarly distinguished.



The alternative term, *wese*, common to nearly all Bantu languages, is usually reserved for "own father," but not always.

Latterly, though the relationship is really *akwego*, the husbands of a man's "daughters" or "grand-daughters" are called *atati*—in a complimentary sense, not of course in defining relationship.

The word *akwego* is rapidly falling into desuetude for men, and is, nowadays, never used in speaking to a man of that relationship, though used freely as a mode of address to women.

*Amao* (or *achikulu-wangu*, *-wao*, etc., "my, his mother") may be further defined as "great" or "little" in the same manner as *atati*.

The parents of any *atati* or *amao*, and those of one's wife are called *ambuje* ("grandparent"). Great-grandparents are specified as "father" or "mother of my grandfather (or mother)."

The founder of a family is called *Likolo*, especially in prayer—except for the augmentative prefix obviously the same word as *Nangolo*, "a parent," which includes all "fathers" and "mothers."

It is curious in this connection that a name for little girls in general, if one does not know their real name, is *chikolo*. All these words seem to be derived from *-kola* ("have," "possess"), and refer, probably, either to actual or potential possession of offspring.

*Achinangolo* are distinguished as "male" or "female" according as they belong to the father's or mother's side—irrespective of their own sex.

*Conclusions.*—The Yao nomenclature of relationships, bearing as it does the evidence of former group marriages, is, like other classificatory systems, gradually changing in conformity with the development of the race, so that it can be used to express consanguinity; Rivers has, I believe, called attention to this process.

The Yao custom—now dying out—of lending one's wife to a visitor (usually a close friend) may be a remnant of ideas carried on from communal marriage, though such a privilege is never given to a relative.

In the same way a man who has had no children (a great stigma) may request his friend to help him—he will never ask a relative—and all of the three parties will keep the secret of the true paternity of any children resulting.

In many tribes the marriage of brother and sister, or a man with his sister's child, is permitted to compensate for the law by which a man's property goes to the son of a stranger, but nothing of the kind is allowed among the Yaos. Indeed, they view any incestuous union with particular horror, and such must be very rare. I have heard of a case of a man committing incest with the idea that he would thereby become endued with supernatural power, but all he gained was ostracism; in the old days he would have been burned.



It is becoming increasingly evident, however, that the law of succession is being avoided, not by extension of the number of marriageable relatives, but by laxity in the observance of the law itself. Nowadays the legal heir is never quite sure of his position, though, as a matter of fact, there is not now much competition for a position which, under European rule, is often exacting and yet unprofitable.

Moreover, owing to the abrogation of the drastic native laws regulating the sanctity of the marriage tie, marriages are becoming increasingly temporary in character. This is reflected in the system of relationship, as the relatives by marriage are becoming equally temporary.

## NOTES ON EDO BURIAL CUSTOMS.

By N. W. THOMAS.

## LIST OF TOWNS.

| EDO.                           |     |     |     | PAGE     | KUKURUKU—continued. |     |     |     | PAGE |
|--------------------------------|-----|-----|-----|----------|---------------------|-----|-----|-----|------|
| Edo (Benin City)               | ... | ... | ... | 378      | Irua                | ... | ... | ... | 395  |
| Eviakoi, Iyawa, Usen, Igwiximi | ... | ... | ... | 382, 385 | Sugbenu             | ... | ... | ... | 396  |
| Gwatō, Ugo                     | ... | ... | ... | 385, 381 | Igiawe              | ... | ... | ... | 396  |
| Okolo                          | ... | ... | ... | 385, 386 | Ewu                 | ... | ... | ... | 396  |
| Utekō                          | ... | ... | ... | 386      | Idelu               | ... | ... | ... | 396  |
| ORA.                           |     |     |     |          | Idumebo             | ... | ... | ... | 397  |
| Ijeba                          | ... | ... | ... | 387      | Ako                 | ... | ... | ... | 397  |
| Sabongida                      | ... | ... | ... | 389      | Fugar               | ... | ... | ... | 399  |
| Afuje                          | ... | ... | ... | 389      | Agenegbode          | ... | ... | ... | 399  |
| Wareke                         | ... | ... | ... | 390      | Opepe               | ... | ... | ... | 400  |
| Esa.                           |     |     |     |          | Kominio             | ... | ... | ... | 400  |
| Uromi                          | ... | ... | ... | 398      | Soso                | ... | ... | ... | 401  |
| Ubiaja                         | ... | ... | ... | 398      | Ibilo               | ... | ... | ... | 403  |
| KUKURUKU.                      |     |     |     |          | Isua                | ... | ... | ... | 403  |
| Aroko                          | ... | ... | ... | 388      | SORO.               |     |     |     |      |
| Okpe                           | ... | ... | ... | 388      | Sapele              | ... | ... | ... | 404  |
| Semolika                       | ... | ... | ... | 402      | Okwoloho            | ... | ... | ... | 404  |
| Otua                           | ... | ... | ... | 389      | Eferun              | ... | ... | ... | 404  |
| Yaju                           | ... | ... | ... | 390      | Ajeyubi, Ugeli      | ... | ... | ... | 405  |
| Auci                           | ... | ... | ... | 391      | Ewu, Ugo            | ... | ... | ... | 406  |
| Uzaitui                        | ... | ... | ... | 392      | Iyede               | ... | ... | ... | 406  |
| Agbede                         | ... | ... | ... | 392      | Agbasa              | ... | ... | ... | 406  |
| Idua                           | ... | ... | ... | 393      | Kokori              | ... | ... | ... | 407  |
| Jagbe                          | ... | ... | ... | 393      | Okpara              | ... | ... | ... | 407  |
| Idegum                         | ... | ... | ... | 393      | Ovu                 | ... | ... | ... | 407  |
| Ama                            | ... | ... | ... | 394      | Jese                | ... | ... | ... | 408  |
| Uzia                           | ... | ... | ... | 394      | Warifi              | ... | ... | ... | 408  |
| Eda, Ekbe                      | ... | ... | ... | 395      |                     |     |     |     |      |

In 1917 I published a paper<sup>1</sup> on the burial customs of the Ibo, who straddle the lower Niger for about sixty miles, beginning at a point the same distance, as the crow flies, from the sea. West of the Ibo lie the Edo-speaking peoples, cut off from the sea by the Ijo and Šekri and bounded on the west and north-west by the Yoruba, on the north-east by the Igbara and south of them by the River Niger as far as the deep and rapid Oro river, which cuts off the Esa from the Ibo. The tribes included in the area thus circumscribed have no common name, and I have termed them the Edo-speaking peoples, from the name of the most important tribe, located round

<sup>1</sup> *Journ. Roy. Anthropol. Inst.*, xlvii.



Benin City. South of this tribe are the Sobo, a section of whom appear to have fled from Edo oppression into the Kukuruku country, where they now speak Kukuruku, but are distinguishable both by elements in their material culture and by their music. Immediately north of the Edo proper comes the Ora tribe, east of Ifō, and south-east of them the Eṣa, who probably submitted to Edo till some seventy years ago. North of them come the Kukuruku, whose languages are very diverse. Generally speaking, the tribes fall into three sub-stocks, Edo-Eṣa-Ora, Sobo and Kukuruku.

So far as head measurements go the tribes are very similar, but the facial types differ widely, partly owing to the effect of face markings; there is a special type associated with the upper classes of Benin City, probably owing to the Yoruba blood in them. Usen, in the north-west, departs somewhat from the type for the same reason.

Apart from internal movements like the Sobo migration mentioned above, the area seems to have undergone little change for hundreds of years, a point borne out by the head measurements. The Yoruba line of kings traced itself to King Eweka; the sixteenth from him, Esige, was the ruler of Benin when the Portuguese came in the sixteenth century, and he stands midway in the line; it is therefore certain that the Yoruba rule goes back to A.D. 1300, perhaps much earlier; if we assume that the length of reign was the same before and after Esige, Eweka must have lived about A.D. 1100.

After listening to the Kukuruku of Okpe, whose towns, perched on the tops of the hills, were probably independent, I formed the opinion that they may have separated from the Edo proper some six or seven hundred years ago. There are peculiarities about the language of Otua that suggest foreign influence; this is borne out by skull measurements. One man, 172.5 cm. tall, had a cephalic index of about 65; a woman of 28, only 151.1 tall, had an index of 64; in the other direction one Otua man and four from the neighbouring Okpe had an index of over 80, in a total of seventy measurements, whereas the Edo proper had only two over 80 and six under 70 in a total of two hundred, and the semi-Yoruba Usen people had four at 78 and three at 69.5 in a total of twenty-six.

Data were collected in some fifty towns, the Eṣa being the only group that were not dealt with systematically. A list of the towns appears above.

My data for Benin City are relatively scanty, mainly owing to the attitude of the chiefs, who prided themselves on giving me no information, I am told. But as the customs of Benin were an exceptional development, this deficiency is made up by the fullness of the records from the more primitive areas.

Among the Edo proper, totemism, or what we are accustomed to call by that name, is mixed up with the burial customs; the tabued animal is sacrificed, forbidden actions are performed, etc. I have dealt with this portion of the custom elsewhere.<sup>1</sup>

I may add that it proved practically impossible to watch a burial.

<sup>1</sup> *Anthropos*, x, xi, 238. See p. 386 for a brief account.



As a rule the burial customs depend for their character upon whether the deceased has children or not; in a certain number of instances childless people are buried with the same ceremonies as those who have left descendants, and this whether they are men or women; but as a rule the heirless man or woman receives treatment little or no better than the child, who is simply thrown into the bush.

There are certain well-marked local differences, especially between the customs of Edo itself and of the surrounding district; besides this there are minor variations depending upon the rank of the deceased, such as the absence of lamentation for a poor man, but the most important differences are those which depend upon the family to which the deceased belongs, for this determines the nature of the burial sacrifices.

For various reasons I obtained only a brief account of the way in which the King of Edo was buried, and the account is far from being complete, mainly because the duties seem to have been shared among many officials and no one felt himself able to give a conspectus of the whole, and, at the same time, many of the chiefs who had officiated at the burial of Adolo in the late eighties had died and left irrecoverable *lacunæ*.

1. Aro's family played an important part in the burial ceremonies, and Aro and Ojumo contributed cattle and other supplies; they also determined how much in all was to be collected for the ceremonies. On the first day the people were called together and the customs announced for the following day. Ojumo was sent for, a cow sacrificed in the gate of the palace and handed over to Ojumo and guns were fired in all the quarters. On the second day other chiefs were summoned, and cows, goats and calves were sacrificed; this was continued on the third day, the chiefs attending in order of rank. On the following day all the chiefs met, and the day for *exarwe*—i.e., dancing, eating, etc., was named. The chiefs went to the front of the palace and a man and a cow slain in each of the nine gates; the man was put in the hole (? *ihā*) allotted for the purpose and the cow was eaten. Then each chief who had a dance of his own went to the Edaiki (heir-apparent) with his people and danced before him; this continued for two weeks. This was followed by *isotō*, the day of expenses, when the sons-in-law came and brought goats; the son-in-law and brothers-in-law contributed human victims, of whom 200 of each sex had to be slaughtered—no more and no less—and those who could not afford slaves brought cattle or fowls. These victims were slaughtered in the two market-places. The markets were closed at the death of the king and food fetched from the villages; after his funeral the bones of the victims were swept up and thrown away.

2. I received from Osula, son of Adolo's daughter, an account of the burial of a princess. His mother was first of all lamented by the people of her house—the arms are placed behind the head for this or other lamentation—and then a big basin was brought to wash the body, together with cloth, two or three pieces joined, and perfumes. At the same time a goat and a fowl were slain and eaten by the family and the blood left on the ground; this was close to the *ukbo* (round platform) on which



the body is laid out; the goat is roasted whole in the skin, the cow skinned in the ordinary way. Slaves or freedmen dug the grave, eight feet deep, in one of the rooms. The heads of the family were informed and the dances began; one of these was secret and a day for it fixed by the head son and the head of the family, the others were public and accompanied by processions, in which the *otō*, or burial shrine, also called *okun*, paid for by all sons-in-law, and by other members of the family at will, is carried round: it is a hideous object—European cloth and tinsel covering a rectangular box, of which the upper portion of the front retreats. In front of it are carried the yams, etc., contributed by the sons-in-law. As a rule it was regarded as a merely ornamental piece of equipment; but Ihama, one of the oldest chiefs, whose information was always reliable, so far as I could judge, informed me that it was carried as a substitute for the actual body.

Each son, wearing a dress like a woman's cloth, three or four lengths, round his waist and his arms supported by a brother-in-law, had his own procession; the daughters, also, clad in dark blue cloth and carrying loom swords in their hands, had their own group. The men's and women's dances were also independent of each other.

After the grave was dug it was beaten and rubbed, and costly cloth put inside it. When inhumation was about to take place, children of slaves and criminals were brought and laid themselves down in the grave; the corpse with its wrappings was put on the top of them, earth was thrown in and the victims suffocated. The head of the family then took dust, passed it round his head, and put it upon the breast of the corpse; he was followed in this by all the children, male and female, of the deceased and then by the rest of the family. Finally the grave was filled in. A cow or other animal was killed on the top of the grave, and its blood poured upon the grave; its flesh was eaten.

On the last day of the customs a member of the family, called *nodiyaia*,<sup>1</sup> dressed up and sits as representative of the dead man to watch the dance (*ikpowe*). He had to keep awake all night or he would die; his clothes reached only to the waist and a white cloth was on the top.

3. For the burial of the ordinary man no human victims were provided. The first act is for the family or the grown sons to lament the death, by which they inform the neighbours of their bereavement. The body is then taken to the back of the house, washed with native soap and lufa, a new pot and new mat being also provided. The corpse is brought back to the house, laid on a new mat placed on the *ukbo* and covered with a white cloth. For a big chief, necklaces of beads are provided, for a smaller man cowries washed white are used as bracelets; white feathers from a bird called *ohogō*<sup>2</sup> are put in the hair.

Lufa and a new pot are put in the room and a goat brought and sacrificed by

<sup>1</sup> *N o d i r a y a* = who represents his father.

<sup>2</sup> Probably the fish-eagle.



cutting its throat. Blood is put in the pot and on the lufa; this is the sacrifice to the dead man's feet. The animal killed is frequently the *awaigbe* (totem) of the family<sup>1</sup> and therefore varies; where no special animal is enjoined, a goat is used.

At an early period the members of the family are summoned, in some cases by the head son, who calls on them in order of precedence. The grave is dug by slaves, members of the family or neighbours—in the first or father's room for a man, in the second or mother's room for a woman; if for any reason the burial takes place elsewhere, the *uxure* are put in these rooms. The burial takes place on the day of death or the day after.

The family assembles to dance and sacrifice, twice a day for seven days in the ordinary course of things, though some families sacrifice for four, others only for one day.

On the third or fourth day the procession goes to the market-place Ekioba and the head son takes *ebe*<sup>2</sup> and thanks the tree known as *Emota*,<sup>3</sup> that his father died in peace.

The non-performance or irregular performance of burial customs entails penalties both on the deceased and on the living. The dead man takes with him to *elimé* (heaven) the yams, etc., offered at his funeral; but his family there assembled, after taking possession of them, decline to recognize him as one of themselves and he becomes a sort of spiritual outlaw. He is, however, in a position to wreak his vengeance on the defaulters by making them ill, by preventing their wives from bearing children, and by causing them to lose their property. The remedy is for the son to kill a goat and beg his father to relent; how far this affects the lot of the deceased I did not ascertain.

The end of the burial ceremonies is called "throwing away of sticks."<sup>4</sup> The last act is to return to the house and mark with chalk in the first room the spot where the *uxure*<sup>5</sup> are to be set up.

4. The different *igie* (princes) who ruled over parts of the kingdom of Edo were descended from kings of Edo, but their burial ceremonies did not differ very markedly from those of the ordinary man, to judge by the account which I got at Ugo.

The body is washed and the "bed" rubbed with white chalk; after a dance lasting all night a cow and a goat are brought and their blood run into a small hole dug in the house; the meat is shared by all the town. The grave is dug inside the house and cowries put in it, then the body, then more cowries and chalk; but first of all a thing like a bed is made and put in the grave. A goat and a cow are sacrificed on the top. Chalk is ground on a plate, and the family come out of the

<sup>1</sup> See *Anthropos*, X, XI, 240.

<sup>2</sup> Ceremonial sword.

<sup>3</sup> In the market-place.

<sup>4</sup> See pp. 386 and 402.

<sup>5</sup> Staves representing the ancestors.



house; then a line is drawn with the chalk to the room of the dead man. The son brings one goat to be sacrificed by the head of the family, and from this time on the son is *ogie* in his father's place.

5. In the Edo villages the procedure is in the main the same as in Edo itself, save that the *otū* is not used, the name being applied to the yams, cloths, fowls, etc., offered by the sons-in-law. At Idumowina the son reports to the head of his own family and of his mother's family and then asks the women to lament. Before burial, chickens are brought for purifying the body; the sacrifice to the feet is said to be to make the dead man strong to travel to *elimì*. The grave is dug by the *igēle* (youths) who also put the body in the grave.

6. At Eviakoi and Iyawa and at Usen the nails are cut when the body is washed and a piece of hair is shaved round the forehead; at Eviakoi I was informed that they were put in the grave with the body. At Eviakoi two men undertake the washing of the body and hold the corpse in the chair till it is dry; the hair is also combed.

The body is decorated with cowries and *ihogō* feathers, as in Edo, white cloth is put on the bed, and the body, sewn in a white cloth, is put on the bed with a pad beneath its head. The bed and floor are rubbed with chalk. The place is also smeared with blood when the goat has been sacrificed. The goat is cooked by a boy or by the widows; if the former, the widows come and get the head, together with yams for preparing *fufu*. In Eviakoi the sacrifice to the feet takes place where the body is washed; the ordinary rule seems to be to sacrifice in the house. The remainder of the goat is shared out among the family.

The seven burial songs are then sung to the sound of a drum, the family marching round seven times to the places of sacrifice. The songs appear to vary from place to place and are apparently chosen at will by the singers. I noted the following:—

- (1) *Qmō le ye ye*—son buries him (her) who bore him.
- (2) *Eṣa me ba ihogō; qma ge bo lua*—my father put white feathers (in his hair); no one may take it out.
- (3) *N q ma bie, do ge; do ge w qmō lu n qma*—who has not borne child, come and look what a child does for a man.
- (4) *Akpakpasigala ye ro lo; n qma l o sa do si; aile wo gadie*—butterfly (i.e., soul) has flown through the gate; creditors, come and ask; I don't know where he is going.
- (5) *Isu e l ele, i su e l ele; qmō su qma sie l akpa*—I lead him to-day, I lead him; a son leads a man to reach red earth.
- (6) *U ga lolo v era lu nwe; alo lo vie sele*—when you remember what your father did for you your eyes will shed many tears.
- (7) *Ovi ulimi wa y era, vie*—child of dead man, if you remember your father, weep.
- (8) *O fu re; o ho n am eze*—he is finished and gone; he is cold as river water.
- (9) *Iye y owo, iye y owo ye*—I am sorry for his mother.



A special song seems to have been in use for a blacksmith :—

- (10) *Ai gb ogun wili ; em era me a xale w ono legelege*—don't beat an old blacksmith ; my father's word they speak in heaven loud.

On the seventh day at the conclusion of the ceremonies at Igwiximi they sang :—

- (11) *O ri ono ; o we re*—he goes to *ono* (or *climi*) ; he comes back.

These songs are repeated twice daily for as long as the burial sacrifices go on—i.e., from three to seven days.

The grave is dug in the *ogua* (bedroom) and the body buried on the second or third day ; the grave-diggers are usually the *igle* and they measure the body with the midrib of a palm-leaf ; at Iyawa and Eviakoi the grave is spanned, after it is dug, by a small stick ; the sons pay for its removal and may not proceed with the burial till they have done so ; the fee is from twenty cowries upwards.<sup>1</sup>

Ribs of palm-leaf are also used to form a bier, and six of the *igle* act as bearers. The hour of burial seems to vary ; at Eviakoi it is 5 a.m., but at Iyawa it is later in the day. The relatives by birth attend the burial and at Iyawa the wives also ; at Eviakoi and Usen the latter stay away ; chalk and cowries are thrown into the grave by the children. A small chicken is brought by the children and carried round the grave ; they say : *awá la ihí m egbe re ; use n u sue v agmô, uge sue w aw iri egbe re* ; this means " Ban, come out of body ; the trouble that you had in this world you shall not suffer from it again when you come again." The chicken is thrown into the bush.

The grave is then filled in and the *igle* receive a chicken, sometimes a goat also, from the children, or at Eviakoi the grandchildren, of the deceased. This is killed on the grave by the *igle* and eaten by them, but never, so far as I could discover, in the house of the dead man.

At Eviakoi they sacrifice the fowl over the open grave by cutting its throat with the nail of the right thumb ; the grave is filled in, and the children are summoned by the *igle* to march to and fro over the grave ; then the *igle* bring the fowl and put feathers and blood on the top and go home and roast the fowl.

The children then bring water for the *igle* to wash ; sometimes they wash only the feet, sometimes the whole body.

Before they go home the *igle* receive fufu, placed on a mat in the street at Iyawa, and palm-wine ; this they consume before they leave for home. Before they go they purify themselves with half an egg, or at Eviakoi a chicken, given them by the sons, which they pass round their heads, holding it by means of a piece of palm-leaf inserted in a small hole. This ceremony is called *ihó m egbe* (ban, come out of my body) and as they perform it they repeat :—

*Awa wo, awai ra, awa<sup>2</sup> la ihí m egbe*—ban, once, ban, twice, ban, come out of the body.

<sup>1</sup> At Iyawa the *igle* dance when they receive their fee ; this is not the " throwing away of sticks."

<sup>2</sup> *Ipuawo* (*ipuaiva*) is an alternative form, it means one (two) *ipua*.



At Eviakoi the hoe used for digging the grave is touched with the finger dipped in oil.

Sacrifices go on night and morning for a varying number of days on the chalk mark which represents the feet of the dead man. The materials are provided in part by the children, in part by the sons-in-law, who bring, sometimes after a preliminary visit, as at Eviakoi, yams, meat, oil, etc. At Eviakoi the contribution is fixed at a quantity of yams, a new mat, a white cloth, twenty coconuts, *okro* (two or three) *ogi* (beans), black butter and a bag of salt, all on one plate, and one goat. He sends two persons to announce his coming, and stands outside the house; the family come out to see him and the children express themselves satisfied with his contribution; he then tells his companions to dance, which they do till 6 p.m., when he goes back to his own house.

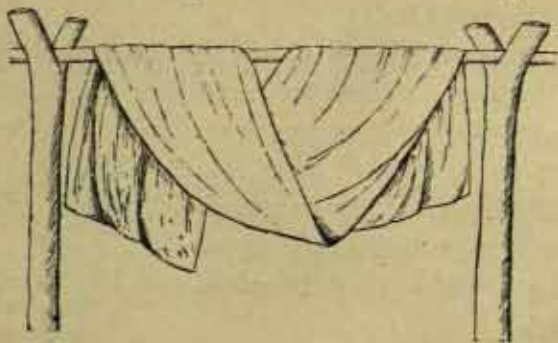
At Igwiximi the contribution is yams, and a leg of *uzo* (duiker); at Usen yams, palm-wine, a new mat, a goat and white cloth, all of which go to the head son; a portion of the white cloth is cut off and put on the grave.

At Okolo, near Usen, a colony from Edo, the sons-in-law bring fourteen yams, a fowl, a calabash of palm-oil, twenty coconuts, twenty kola, and a white cloth to the head son. The goat, fowl and kola are sacrificed, the rest shared.

At Eviakoi I was told that no more fufu was cooked when the ceremonies were finished, because "it made the dead man hungry"—*o gbe 'lumi ohami*.

On the sixth day of the customs divination is employed to discover who is to be "father" (*nodigai*), that is to say, to represent the dead man on the last night: either a man or woman may act where the deceased was a man, a boy or a girl for a woman. He sits in his father's seat; all sons and daughters kneel to him and salute him as father; he is dressed with beads and cloth, and so much of the latter is put on that he is sometimes four feet broad across the hips. The children exclaim, "This is our father; he is not dead yet," throw cowries and dance till morning, and the "father" may not close his eyes.

At dawn the *igle* come and, either in the gate or at the end of the "swept" road, put two pieces of wood in the ground with a third as crosspiece; over this is put



a piece of cloth (in Edo the widow puts up a similar erection by the side of a bush path); the *igle* raise the "father" from his chair; the children bring chalk and



cowries, which are put in a plate and given to a boy; the "father" puts a portion of each on a cloth and puts round his waist. Carrying a firebrand or a stick, the *igele* accompany the "father" and his family along the road as far as the town sweeps, chalk and cowries being thrown till the spot is reached. At Eviakoi he hangs these pieces of cloth one by one upon the crosspiece set up by the *igele*; and a gun is fired when this is done. At Okolo the firebrand is thrown into the bush; at Iyawa the stick with which the *igele* precede the "father" is passed round his head and thrown into the bush, after which a gun is fired.

At Eviakoi the "father" goes home without looking back; when he is close to the house he takes chalk and draws a line into the house to the place where the *uzure* are kept, saying: *era me, xia w owa*—my father, go home. At Iyawa the father takes the chalk in the door of the house from a boy of the family, who is stopped there for the purpose, and the chalk line is drawn from the place where the "father" sat as far as *elimi*, where ancestors are worshipped; this chalk they call "father." At Okolo the line is drawn from outside the town, where they fire the gun; cowries are also put down in the house to represent the father. In each case the "father" puts off the cloths, the widows cook fufu and the family sacrifice and eat.

At Igwiximi the procedure is different. There does not appear to be any "father" custom, but the children go to Uge on the seventh day; there they fire a gun and go back; outside the town all are silent; the head son takes chalk and draws a line back to the house, throwing the remainder on the ground where the dead man is to be worshipped. There is, however, a trace of the "father" custom in the dressing of his brother in fine cloths, taken off after seven days; the first and best cloth belongs to him.

The conclusion of the customs is marked by purificatory ceremonies on the part of the mourners. At Iyawa the last child, male or female, shaves completely, and the widows buy themselves off by a payment of 3*d.* in cowries; the relatives, except father and mother, wash; the parents do not wash, though they lament their son, and this though the burial may take place in the same house; the son is, of course, in such a case buried in his own room. At Okolo and Igwiximi the small children shave, and also slaves; the hair is usually thrown away, but at Okolo it is put on the grave; the wives shave there but throw the hair away.

At Eviakoi a big man shaves a band on his forehead, married daughters in the centre of the forehead; others shave completely; the widows do not shave. One week after the funeral those who have borne children go home after a goat has been sacrificed by the family—they escape shaving by a payment of 3*d.* At Usen married daughters do not shave, but widows shave completely.

7. At Gwatō a goat is sacrificed in the court to the feet of the dead man; the day before the funeral the daughters dance, holding loom swords. The body may be kept two, three, five or seven days, and it is buried, not in the room but under



the eaves. At daylight a bed is made outside with four posts and sticks across; the sons bring kola, and a person of the family, selected by the head, sacrifices there; the bed is then taken away, each man taking a portion; they leave the town with it, dancing on the way, and throw the sticks into the bush. On the way back a line called *o sie le obo la 'wa* (he draws this by hand, enter house) is made with chalk as far as the house. On the road they sing:

*o ri o, o ri ono, ge le re*—he is gone, he is gone to Ono; let him come back.

The sons then make a bed as before and sacrifice a goat to their father.

At Ugo chalk and cowries are put on the grave, and the sons say: "My father, tell Osa the things which you had in this world; tell Osa to give you things when you come back." After the grave is filled a goat is sacrificed on it.

In Okolo a woman or man without children is buried in the same way as a man with children—if there are brothers or sisters to perform the ceremony. In Usen the childless woman is simply put into a grave inside the house. In Eviakoi I was told that all people are buried in the same way, but we may probably limit this to adults.

If the body cannot for any reason be recovered, the son takes chalk, goes out and calls his father's name.

At Iyawa a childless man is put in the bush, where his father and mother cannot see him; where there are only daughters the sons-in-law take the place of the sons in the burial ceremonies.

8. Certain restrictions are laid on widows, but unfortunately I omitted in many cases to ask definite questions on this point. At Gwatō she must sleep on the floor till her husband is buried and she holds a small broom in her hand. She may not cook nor do any household work for seven days, nor even wash; after seven days she performs her ablutions in the road about an hour after sunset. In some places a husband must sleep on the ground when his wife dies.

9. At the entrance to one of the quarters of Utekō are a number of pots, upside down and partly covered with earth, scattered along the side of the road, which is called *uge*. Some of my informants could give no explanation of them, others said that they were put down by men who were too poor to bury their fathers and that they were left there after the burial had been eventually completed.

I saw at Utekō a burial dance called *ugba*, which was not, however, described or alluded to by any of my informants. It can be danced by anyone who knows it, but in each village they have a chief (*ogyēbo*) who directs it; it is danced on the first day before anything else, and on each succeeding day, morning and afternoon. The son of the dead man supplies the dancers with fufu and kola every day; they also receive a goat.

As regards the use of *awaigbe* the animal or bird is killed, or the vegetable procured and cooked, and sacrifices are offered for a varying number of days. One family has *ugu* (vulture) and *iwewe* as *awaigbe*. *Ugu* is cooked for soup and sacrificed



to the dead man's feet and the bones used for soup. From the day the rites begin all the family divide the flesh and soup and eat it; then they purify with *afò*.<sup>1</sup>

10. When the King of Ijeba, in the Ora country, dies, no one laments; the people are told "the king is dead," but they wait till the new king is chosen before they lament the old one. If the sons contravene the regulation they can be fined £5. On the day that the death takes place seven cows are killed in the king's house; then two low walls are made and sticks put across—on them a mat and then the body of the king; then the walls are built higher and the top is roofed over.

The body is washed with gin, and the temporary tomb opened for its reception. If a finger of the body is broken, the son pays 6s. and one goat to the town. A sacrifice is made to the right hand—one cow, one cock, one goat and one ram; fufu is cooked, and they say: "We kill for you, look out for us and don't let us die young. You can help your son to get another son." The sacrificer is the eldest son; he cuts the throat of the victims, takes off the head and pours out the blood.

As soon as the new king is chosen the walls of the tomb are opened, the body is put on a bed with mats, cloths, etc., and the same sacrifice offered as before. In the door (*onoxedo*) of the king's house a similar sacrifice is made and repeated every three days.

The body remains nine days in the house; on the ninth day all nine *otu* join in digging the grave. The corpse is carried out by the ceremonial gate and put down in the street; a cow is sacrificed and a dog to the right hand. The king's widows are brought to this spot and cover their faces with cloth; each woman swears on *ehò*<sup>2</sup> and asks that the *ehò* may kill her if she does not hand over all the late king's property to his son; then they return to the king's house.

The body is then carried on to the grave, and a he-goat killed to the feet before it is lowered into it; the corpse is wrapped in thirty cloths, but a few of them are given to the sons. The grave is filled in by the *otu* (company); there is no sacrifice afterwards. The grave is dug in Iviogulu, where there are now no inhabitants, though it was formerly populated. There are four graves—one for the king and one each for big, small and women chiefs (*igbekabo*). Other people are buried on the road to Iviogulu.

At the death of a big chief the wives and children lament. The son reports the death to the king, and is asked if he is ready for the funeral; if he is, the king tells him to proceed. The grave is dug by the five junior *otu* and the sacrifices—fowl, goat and ram—go on for five days. The corpse lies on a bed; a goat is sacrificed to the door, but the body is carried through the window at the side of the ceremonial door. The wives swear *ehò* as before; a dog is sacrificed on the spot and a he-goat to the hand. When a body is carried to the grave the widows (*oro*) wear a cloth supported by a cord in a peculiar way; they may not touch things used by men nor go to the burial quarter.

<sup>1</sup> *Dioscorea rotundifolia triana*, a creeping plant.

<sup>2</sup> = Edo *ehò* (demi-god).



A woman chief's<sup>1</sup> corpse is carried to the market-place and set down; one *otu* sacrifices a goat to her there and the nine *otu* tear it apart.

The ordinary man is lamented and buried on the day he dies, and a dog is sacrificed to him in the street. They dance till daybreak for several nights; a custom analogous to that of the "father" in Edo is known. Suicides are buried in the same way as other people, but the king may visit suicide in a member of his family with the punishment of exposure: unburied people take nothing to heaven with them.

If a man is killed by a crocodile or if his body is for some reason irrecoverable, the son or daughter sacrifices to him; a palm-leaf is picked and carried with a pot to the road; the man's name is called and the ground touched with the leaf and the son says "Come home." He goes home then and puts the leaf on the bed, with the pot to represent the head; they receive sacrifices and are buried in the usual way. After the customs are over the children wash the house; married children may stay three months, but are free to go when they please. The sons and small girls shave their heads and all wash their clothes.

11. At Aroko, in the Kukuruku country, the burial ceremonies are completed in one day; the body is washed and dancing goes on till daybreak; the male dancers receive 4s. in all, the women 2s. One *otu* digs the grave at dawn; a he-goat is sacrificed and the body taken out of the house, on the heads of two men; when they reach the gate, dancers following, they sacrifice a he-goat in front, the neck of which belongs to the son of the head of the family or other person sacrificing; the remainder is eaten by the family and the blood left in the gate. At the grave away in the bush a he-goat is sacrificed and the head put in the grave, which is then filled by the *otu*.

The contribution of the sons-in-law is of the value of about 4s.

12. At *QXwe* or *Okpe* the family collect as soon as they hear of the death, and one of the sons washes the body, which is put on the bed. The grave is dug by the sons in the house in any room and the body is buried the day after death. The son's son sacrifices a goat under the eaves, which is eaten by the family and the whole town; failing a grandson, someone else must sacrifice. The family of a rich man may keep up the dancing for nine days, but a shorter period is customary.

The husband of the eldest daughter brings a goat for sacrifice, the other sons-in-law bring cloth; the sons, unmarried daughters and widows shave their heads.

If any one dies far from home they go along the road leading to the place and fire two guns; a piece of mud is picked up and put in a cloth when they reach home; the mud and cloth are called by the name of the dead man and the usual funeral rites are celebrated.

If a woman marries a man of another country, her body must be brought back

<sup>1</sup> She receives long white feathers (*ulqle*) of the *ogohgme*, but wears them in life, not after death as in Edo



when she dies, and also all her property if she has no son; compensation may be demanded if the corpse is withheld.

13. When the King of Otua dies the eldest son kills a cow and the corpse is buried the day after death. Each quarter fires guns, and the sons do the same in the king's house. They dance every day for some time, and the son does not succeed till the customs are over, when he becomes king without any fuss or ceremony; chiefs govern during the interregnum.

When an ordinary man dies, his sons buy cloth and bring a dog, a goat and a fowl; these are killed in the gate by the eldest son. The corpse is buried the day after death and dancing goes on for five days. One company dig the grave and there are no sacrifices; the body is wrapped in a cloth. The grave is dug in one of the rooms of the house.

The sons-in-law attend as usual. All sons and daughters shave their heads, as also do the widows.

If a woman marries away, her body must be brought back, and it may be exhumed and brought back to Otua if it has been improperly buried. A man's body is not brought back; they go along the road, call his name, rub the ground, rub a cloth and bring it home; this is the dead body.

14. When the head chief of Sabongida dies, they meet outside and sing for him, ringing bells, firing guns and throwing cowries; his sons carry *ada* and lament in the town, crying "O, my father." Women dance *exitua* and men dance *ejagbedi*. At dawn they take the body outside and kill a cow; the *otu* called Asabekme carries him, two men bearing him on their heads, while others dance after them, singing, "Man is dead, he goes to his peace." The burial over, they come back and begin the seven days; in the morning all shave their heads for him; at night all the family assemble at his house to divide the property.

All chiefs are buried in Odolele quarter; other people are buried in the bush; the body is washed, rubbed with a cloth and sewn up; a ram is killed, cowries are tied round the wrists, a fowl is killed for his hand and fufu sacrificed to his feet; the body is carried on men's heads and others dance behind. There is no special dress, but the cloth is tied in a certain way—the daughters carry a bell. Men and women are buried in the same way, unmarried people just thrown in the grave, and children thrown in the bush.

If a man dies away from home, chalk is taken and his name is called on the road which he followed; the chalk is brought home and buried.

15. At Afufe the head son kills a cow or goat in the road outside the town, and the body, after being dressed, is laid down at the same spot with the animal at its feet; the animal's head is cut off with a cutlass and the body, head and all is carried back. The corpse is taken to Uboa and buried in the bush, where there are separate graves for (a) big men, (b) small men and (c) big women. Small women and children are buried anywhere. All the companies dig the grave and act as bearers.



Sons, daughters and wives shave. Dancing takes place after the body is laid out and before it is buried.

If anyone dies away from home they take a palm-leaf, knock the ground, call his name, beat a drum, say "Come home," fire a gun, and lament. The palm-leaf is put on a bed and buried in the usual manner.

16. At Isebe the body is laid out and a fowl and he-goat killed at the grave; they dance the whole of the previous night and bury at dawn in the bush. All the chiefs are in one place, the younger men in another, and the women in a third place. Sons, daughters and widows shave their heads, but there is no washing.

17. At Wareke the whole town comes and takes the body out to wash in the court, where it is held on a stool and washed by one of the sons; chalk is rubbed on the body and cowries tied from the wrist to the elbow. A cock is killed for the right hand by the head son and a goat is also sacrificed. The corpse is taken inside again and laid on a mat. There is no lamentation till after the burial.

On the first day the *efa*, an eight-stringed guitar, is played, but no special tune is performed; on the second day people of the town dig the grave. There are separate places for big men and women, young men and women, and small children. The body is put in the grave and all the sons throw cowries and go home. The burial of a small man may be finished in one day; in the absence of a son a brother officiates, and in that case shaves his head. A small child is lamented by its housemates, but there is no dance; the father and mother shave, if it has cut its teeth.

In the case of a man for whom the ceremonies are prolonged the day for the dance is fixed after the burial on the second day; on the third day all shave. On the ninth day the dance is held; guns are fired, cowries are thrown to the dancers by the children; brothers and sisters tie white cloth round their waists with a loin-cloth beneath and dance till dawn, when all go and put the cloths on the grave. On their return the sons get a goat and the head of the family sacrifices it to the dead man. The children take half and the rest of the family the other half.

If a big man dies away from home a cloth is taken and the ground is knocked; his name is called and the cloth is taken home and treated like a corpse; if it is a small man, the cloth is taken straight to the grave and buried.

18. At Yaju, when a man dies the married daughters are summoned; the corpse is brought into the court, put on a stool and washed and then marked by a female operator with what are usually women's marks, zig-zags and so on, in black. When the body is brought into the house it is put on a mat and cowries put on the arm; it is then sewn up and the workers are rewarded with cowries. The head son brings a goat, which is killed by a messenger sent by the king; the right hand of the corpse is touched with the blood and the meat eaten by the chiefs, but not by the family.

There is the usual arrangement of three places of burial; two men are sent by the king to dig the grave. The sacrifice over, the body is carried to the bush by anyone who likes to act as bearer. Cowries are thrown into the grave, then



cloth, then earth, the same two men officiating. At the grave-side are all the children, with the brothers and sisters. On their return guns are fired and they lament; a day is fixed for the "burial" (*etolimi*).

When this day arrives, the *akpata* is played till daylight; then chiefs come and receive cowries; small boys bring a drum (*aligba*) and dance. In the evening a ladder is made with posts planted in the ground and a cross-log, and cowries, handed from one man to another, are put on the top in a box; the son is highest on the ladder and sits on the crosspiece. After he has thrown cowries all come down and the ladder is taken down and thrown away. After this there is more dancing, and all go home.

The next day all the family shave and wash at the waterside; the head son shaves only half his head, each side alternatively for five months.

A woman is buried in the same way. Small people with only one or two sons get no goat and the customs last only one day, but the family shave. Those who have no children are simply buried, but the brothers and sisters shave. For small children, shaving is not enjoined.

19. When a big man dies at Auči the body is put on a stool in the house and washed; then cam-wood is rubbed on it and it is marked with black, and wrapped in cloth and a mat. A goat and a cock are killed for the hand, and the chiefs share the goat with the sons. A dog, white hen (*ebokwele*), snail and tortoise are also sacrificed. The grave may be dug by brothers. The body is carried, in the case of chiefs, in a long shallow trough, others on a bier of seven palm-ribs; sons and daughters attend the funeral but not wives; cowries are thrown on the road, and the remainder into the grave. The body is covered with wood.

On their return the bearers wash all over, the others wash hands and feet in the compound of the dead man. Cowries are put down by the sons on the spot where the body was washed, as a recompense for the bearers. On the homeward road the *akpata* is played, but there is no dancing.

In seven days the second burial is celebrated if the sons have sufficient money in hand for the expenses; the sons-in-law bring cloth and cowries. The street and court are cleaned and cowries thrown to the people, who come and dance. The sons and brothers buy white cloth and dance from morning till 4 p.m. The cloth is divided—some goes on the grave, some to the head of the compound and the brothers of the deceased; the sons take none.

Five days after this the sons shave one side of the head; the other side is shaved seven days later;<sup>1</sup> daughters married in *amoya* bring 2*d.* and are excused, *isomi* wives shave;<sup>2</sup> all wives shave completely; sisters shave the whole head if they are young, otherwise only the forehead. The father, mother and grandchildren do not shave and the wives do not wash; the hair is thrown away in the bush.

<sup>1</sup> This is called *ubeka*.

<sup>2</sup> The *amoya* wife is in her husband's *potestas*, the *isomi* wife does not leave her own family.



If the body cannot be recovered, they cut palm-leaves, go along the road, touch the ground, call the dead man's name, tie the leaves in a cloth, bury them and wash.

20. At Uzaitui they wash the body, take a cloth and mat to wrap it in, and lean the corpse against a wall inside the room. A fire is made at the foot of a mound of earth just below the corpse, and it is kept there till they get money. In about four days they proceed to bury it. A big goat, which is brought by the head son, is killed in the street before the house; the head of the compound kills it and the head and the three oldest men of the compound share the meat. It is killed in the morning of the day of burial, and the bearers walk through the goat's blood. The body is carried to the bush, cowries being thrown on the road; anyone may act as grave-digger or as bearer. Sons and daughters go to the grave, but no other females; four men put the body in the grave, a cloth and mat over it, then wood and then earth. This done, they return to the house of the head of the compound (*okpi-o nedignafe*), and he gives water to the bearers for them to wash their hands; then he gives them a pipe of tobacco and they go home.

It is forbidden to bury anyone in the September-October moon, and in the October-November moon; when anyone dies in these months the body is put in the bush and they wait before they sacrifice and bury it.

21. As usual, there are three localities for burying: one for chiefs and older people, one for young people, and one for small children. The latter has less room than the two others.

Old people are carried to the grave in a long shallow trough called *osemota* or *uko*. The bearers (*ikagba*) bring these back after the funeral and put it either in an empty house or under the eaves.

Pepole who die young are carried to the grave on a flat bier of bambu (*ikbeko*). This is a punishment, I was told, for early death. The grave has a small mound on it and the *ikbeko* is left on the top.

Where the body cannot be recovered, the sons go to the road along which the deceased went when he left the village, and cut off the top of a palm-tree. They then touch the ground and call his name; the leaf is taken home, put in a mat with cloth, and buried exactly as if it were the corpse.

The day after burial, sons, daughters and all wives shave their heads completely; sisters shave their foreheads; the brother leaves a small patch on the middle of his head; the father and mother shave if the first child dies, but not for others.

If a daughter has been given in *amoya*, she does not shave for her father and mother.

22. When a rich man dies in Agbede the eldest son kills a goat to his right hand after the body has been washed and laid on the ground. The goat is shared out and eaten with fufu; a portion of the fufu and meat is put in the dead man's hand and washed out with water.

The king and big chiefs are buried in the town, at the back of the house; small



chiefs, men and women in three separate places in the bush ; but the wives of the king or of big chiefs are buried with them, but on the other side of the ground at the back of the house. The grave is dug by the family or by house-boys ; a mat and cloths are laid down and the body put on them ; for a big man sticks are put over the body ; there is no sacrifice at the grave.

There is a dance at daybreak on the second day for a rich man and the sons must summon his *otu* to help ; the father-in-law comes too and a cow or goat is sacrificed. The son fixes a day for the customs for a poor man.

The family of a rich man stay in the house five days. Then all children, brothers and sisters, wash and shave ; the widows remain three months in the house and then shave ; the hair is swept up and thrown away ; they lament and return home. A husband does not shave for his wife, nor do other wives, only her own children. Sons wear mourning dress (*ibiniku*) for an important man ; they put this on when gifts are distributed twenty days after death and wear white cloth (*elimobo*).

23. At Idua a goat is sacrificed by the head of the family inside the court to the dead man's hand ; the head is cut off and the body is eaten ; the funeral takes place within twenty-four hours of death.

There are two places of burial—one for older people, one for younger people ; small children are thrown on the rubbish heap. They lament only for younger people who have no children, and dance also for old people who have grandchildren.

The daughters of a dead man put white chalk on their legs, and leave it for seven days. When they dance they carry the loom sword. The sons and unmarried daughters shave their heads ; married daughters pay sixty cowries to the head of the family.

If a man dies away from home, sons call his name, take a plantain stick, lay it out on the bed, sacrifice to it and bury it.

24. At Jagbe women lament when a man dies, and his corpse is washed on the bed ; the sons-in-law bring goats, cloth, powder and cowries. The whole town comes to dance on the day of death, and he is buried on the same day.

Before the corpse is carried out it is put on the floor and a goat is killed at its feet ; the family dig the grave and two selected men are bearers. No women go to the grave, nor do young boys.

The graves for all are in one place, but each person gets a separate grave.

When the men come back they dance again for seven days and fire guns. Sons, brothers and sisters and unmarried daughters shave : married daughters shave the forehead only ; after shaving, all wash at the back of the house or in the court.

25. At Idegun, after the body is washed and dressed, a goat is killed to the dead man's waist, and a ram and a cock to his hand ; this is done on the same day ; the funeral takes place before night-fall ; when they return they fire a gun and dance.



The graves are all in one place in the bush, but divided up so that big men are buried in one place, women in another, small men in another. Six companies dig the graves and act as bearers.

The children, brothers, sisters and wives shave if they are living in the house ; married daughters pay 1800 cowries ; daughters-in-law do nothing ; after shaving they wash on the seventh day at the waterside.

26. At Ama the corpse is washed and dressed, and a grave is dug in the middle room of the house ; a goat killed on the grave ; after it is filled in, a dance is held on the first day and guns are fired ; for seven days they play " small small." Small boys and girls are buried in the bush.

If a man dies abroad, they take the mid-rib of a palm to the road, point in the direction in which the man died, take it home and bury it. They shave the head on the seventh day and wash at the waterside.

27. At Uzia the body is washed and dressed with a white loin-cloth. A leaf mat (*eba*), used also as a sleeping mat, comes next, and then a big white cover cloth. All the sons bring a cloth and a mat. The surplus is divided when the ceremonies are over.

On the second day, if it is a big man, a goat is sacrificed to his waist and blood smeared on the corpse. The grave is under the bed where the man slept ; it is dug by the last four *otu* ; after it is filled in the son occupies the bed.

A goat is sacrificed, not only to big men, but also to women and men who have no children. All children except the youngest are buried in the house.

The second burial of the big man begins in seven days. The married daughters bring a goat, cowries, a small cloth and three small sticks of bambu ; the bambu is covered with cloth and put upon the grave ; it is then called the corpse. A goat is bought by the sons and sacrificed by one of the chiefs to the bambu ; and all goats owned by sons or daughters are sacrificed to the bambu ; a leg goes to the head son and the chiefs take the rest ; the head son eats his portion with his brothers.

On the same night two men bring the bambus to the verandah, where the goats have been killed, then take them back to the grave. When all are asleep, the same two men take the bambus and cloth and throw them away.

The sons cook fufu for seven days ; the cooking place is then swept free of ashes, which are thrown away ; the compound is rubbed with mud. When the daughters come from the husband's house to their father's house, they throw cowries along the road, and cowries are thrown again at the dance, which is held only on the one day, when all the chiefs come.

If a man dies away from home, a palm-leaf is taken and treated as usual ; the ceremonies with the bambus is performed as before. If a man has no sons, his brother can sacrifice a goat. On the seventh day all the sons and daughters shave their heads and wash at the waterside.

28. At Eda a big man is laid out ; a goat or fowl and a ram, and, for a warrior



who has killed his man in war, a dog also, are killed in the court in the one place. The hand of the corpse is touched with the blood, and all the town eats the meat next day; the skins go to the family. On the second day men are chosen to dig the grave in the bush; they carry the body to the grave in the evening and a dance is held when they return. The daughters and sons-in-law must bring each ten shillings' worth of cowries or more; the husband of the eldest daughter must bring a goat within three months. Dancing goes on for seven days in the first instance, but begins again when each son-in-law brings his contribution.

A man's widows wear cloth in a special way, with the fringe at the top and the pattern running lengthwise, for three months.

For a rich woman a she-goat and a hen may be sacrificed; for a poor woman nothing is offered. Sons, daughters, wives, brothers and sisters shave for a man in five days; if a son-in-law has no cowries, the daughter can come without him; a son shaves for a poor woman; sisters and brothers shave their foreheads. There are no customs for people who have no children.

If a man dies far away, his bed is measured with a stick, and this is buried with a piece of cloth.

29. At Ekbe the corpse is laid out, but no sacrifice is offered. The grave is dug in the bush, and the gravediggers are also bearers; cowries may be put in the grave. The family sit down for five days, then, including the wives, shave their heads. There is no dancing. If a man dies far away they take a piece of cloth and bury it.

30. At Irua the sons wash and dress a rich man in the garden; the body is put inside a sleeping room (*ukuku*), the feet turned to the door, and a goat is killed to his feet, a hen to his hand, and a cow to his waist. In the case of a poor man, only a goat is sacrificed. The grave is dug by a brother or a friend in the bush; there is no distinction in locality, but a separate grave for each person. A poor man is buried on the first day, a rich man on the second; the body is carried by the brothers, and the funeral attended by men only. The head son leads the procession, other sons throw cowries. Cowries are also thrown in the grave, and in the present day sticks are put over the body before the earth is thrown in. When they reach home they wash hands and feet. Sons, wives and daughters lament; sons and daughters, except the head son, shave their heads on the seventh day, and all wash. For a rich man they dance for a few days.

The second burial takes place on the ninth or the tenth day; the sons put a goat, a cow, a hen and yams, sacrifice to the *ixure*, and give to the head chiefs to eat; people who come to dance receive cowries and palm-wine. The sons and daughters-in-law contribute a goat or a cloth; they also bring cowries, fire guns and dance; the goat goes to the head son, who can either eat it or sell it.

If a man's body cannot be recovered, they take a cloth and hold it to the east, call his name, and bury the cloth. If a man has no sons or brothers, he is buried by his neighbours, who, however, are not responsible for his debts.



31. At Sugbenu, near Irua, the sons sacrifice a goat to the man's waist, a goat to his hand, and a cock to his head. Boys of the town dig a grave in the yard (*agá*) at the back of the house, and the *igéle* carry the corpse there. A small man is buried in the bush, as are also young women; old women, who have borne children, are buried just off the street near the house; children are buried in the bush. Cowries are thrown in the grave and the funeral is attended by sons, daughters and sisters; all have to wash; they dance all night, and at daybreak all the sons, except the first-born, and daughters with the unmarried brothers and sisters shave their heads and then wash in the house.

32. At Igiawe sons wash and dress the corpse, and make a mat of seven bambus; cloth is put on the corpse, and it is covered with the mat. A cow is sacrificed by the father's brother, with—in the case of a rich man—seven goats, in other cases three goats—one for the waist, one for the hand, one for the mouth—which are killed on the ground below the bed. Guns are fired and a dance is held, for perhaps three days; then a grave is dug in the bush by young boys, and the family carry the corpse to it; no women attend. After the grave is filled in the place is swept and the people come home and wash.

The son-in-law must bring a goat, cloth and cowries. If he arrives too late for the funeral these belong to the head son. After the funeral they dance for three days more; and on the seventh day, all sons, except the head son, with the brothers and young daughters, shave their heads and then wash at the waterside.

If the body cannot be recovered, the hair, which big men put in the roof,<sup>1</sup> is shaken down with a stick, put in a calabash and buried.

33. At Ewu the body is placed on a bed and the head son sacrifices a goat or a cow to the feet, which are turned outwards. People are chosen to go to the bush and dig the grave; others are chosen as bearers; the sons may not act. Cowries are thrown into the graves before the body is put in; on their return the bearers only wash their legs and hands. A dance is held for one day only. In seven days the small girls and all sons, except the head son, shave. A married daughter pays 100 cowries to the head of the family to be excused; widows do not shave, but remain at home three months, and then shave. The sons wash, but not the daughters, who pay cowries.

34. At Idelu the sons make a mat of seven bambus, and sacrifice two goats, one for the feet and one for the hand. A small man is buried on the same day, a big man on the following day. Young boys dig the graves and carry the corpse; on their return they wash their hands and feet.

A dance is held one day after the burial and guns are fired. After death, nails and hair are cut from the dead man and put in a calabash; when they dance, a

<sup>1</sup> Important men put up their hair as a woman does; the loose combings are put in the roof.



goat is sacrificed to this and the calabash is afterwards buried; those who bury the calabash have to wash. When they return, new made *uzure* are put inside the court; they cook fufu and sacrifice to them for seven days, calling on the dead man. Then the *uzure* are taken inside, more fufu is cooked and another sacrifice takes place.

On the same day the sons, except the head son, and the unmarried daughters shave and wash.

If the body cannot be recovered, they take a goat and cloth, stand outside the court, show them to the sun and call the dead man by name. A plantain is cut and represents the dead body.

35. At Idumebo, near Irua, a goat or fowl is sacrificed to the dead man and eaten by the sons and people in the same house. The firstborn carves *ikute* (*uzure*) and puts them where he himself sleeps. Sons carry the corpse and throw cowries in the grave and on the body; when they return home the bearers wash their hands and feet and the head son gives them cowries saying, "Welcome." Sons and wives remain at home seven days; then the family is called to bury their father; the eldest son brings a goat and a fowl; the old *ikute* are thrown away and the goat is sacrificed to the new *ikute* in the court (*olele*), and they are then brought back to the room in which the son sleeps. Sons-in-law bring a goat and fowl, cloth and cowries. The goat goes to the head son, the cloth to the family, and the cowries are sacrificed by the son-in-law to the *ikute* in the court.

They dance for three days or four days after the second burial; after the dance the sons, except the head son, brothers and small daughters shave; married daughters pay 100 cowries to the family; the firstborn brother of the dead man does not shave; all wash at home.

If a stranger dies the old people choose a man to bury him; there is no responsibility for debts.

If the body cannot be recovered the sons cut *ikute*, hold it out towards sunrise with cloth on it and bury it.

36. At Ako mid-ribs of the palm-leaf are cut, a mat put on them, and then cloth, on which the body rests; a goat is sacrificed to the feet; a rich man lies there for three days, a poor man for one day.

The grave is dug in the bush by boys; a brother but not a son can act as bearer; the head son puts cowries in and over the body in the grave; outside the court (*olele*) he gives bearers water to wash their hands and feet and rewards them with cowries.

Sons and daughters, brothers and sisters, and widows remain at home seven days. In about fourteen days the second burial takes place: guns are fired; the sons-in-law bring a goat, cloth and cowries; the cloth and cowries are given to the family; the fowl is killed by the head son on the grave and taken home by the son-in-law, the goat goes to the head son, who is at liberty to sell it. The head son makes *ikute* for the second burial; he puts them where the goat has been sacrificed and offers fufu



to them; then he takes them into the house to his sleeping-room. This is called "taking the father into the house."

If the body cannot be recovered they catch a hen and hold it out to the sun. Cloth is put over it; a circle is drawn on the ground with the foot and the fowl killed within the circle, given to the head of the family (*ojegbele*) and eaten by him. The cloth is then put in a calabash; the goat and hen sacrificed to it and the calabash and cloth are buried.

The head son does not shave; a daughter may redeem herself by 760 cowries; sons and daughters shave early in the morning; the hair is thrown into the bush; they do not wash; the widows re-marry in three months' time, but do not shave.

37. At Uromi the body is washed and dressed and laid on the bed; a goat is sacrificed on the floor. The corpse lies for one day and then the family gives a grave in the *aga*; <sup>1</sup> some of the family act as bearers and they wash when they return.

In three months' time the head son calls the family to bury his father; a dance is held at which he gives dashes of cowries and cooks for the whole town. Sons-in-law bring a goat, cloth, and cowries, all of which go to the head son; dancing may go on for a whole month. Women are buried in an open space (*ugili*) leading to the market; small men and girls are buried in the bush, as also are children. If the body is irrecoverable, a palm-leaf is taken and held out to the sun; the leaf is put down and *uzure* placed near it. Sacrifices are offered and the palm-leaf is buried; the *uzure* are kept in the house. In this case there is only one burial; in ordinary circumstances the *uzure* are made on the seventh day of the second burial. The small daughters and all sons, except the head son, shave seven days after the beginning of the second burial.

38. At Ubiaja the body is laid out on the bed; cowries are put on it, which are afterwards picked up by the relatives.

A goat is sacrificed for a big man, which is eaten by the *igle*, the chiefs and the sons take no share. The goat is killed by the head (*odigbama*) of the *igle* and the head son says to his father: "This is the goat which we take to bury you"; before taking the body to the grave a goat is sacrificed and fufu eaten. On the second day the *igle* dig a grave and bear the body, and there is a dance for a big man; a goat or ram is killed and the whole town called to eat it.

Some three months later a goat is killed at the door and they call upon their father to come and eat; a son-in-law brings goats, cloth, cowries, etc.; if he defaults, the wife may be taken away from him. Goats and cloth go to the firstborn, but the goat bought by the eldest daughter is sacrificed and the cloth used in the burial ceremonies. Sons, unmarried daughters, and sisters shave; only the head wife shaves; other wives pass to the head son.

39. At Fugar the head son of a rich man sends to bring water and they wash

<sup>1</sup> Court or garden in front or at the side of the house.



him; the body is then laid on a mat in the sleeping-room (*ogwa*). They lament in the court just outside and throw cowries into the room. In the case of a chief, burial is delayed, otherwise the funeral takes place the same day. Chiefs and women, if they are rich, are buried in the house, for other people the grave is dug in the bush by the sons-in-law while his sons look on. A poor man is carried to the grave by his brothers, drums are beaten, and they dance and fire guns. Anyone may follow, male or female; the whole of the family (*che*) and sons-in-law must follow. A mat is put in the grave first, and then the body, which is covered with sticks, then comes the earth. No cowries are thrown into the grave, but they are placed near it; the bearers and diggers wash.

Some months afterwards is the second burial; the head son cooks yams for strangers; they beat drums and dance round the town; the ceremony lasts for two days. Where people are buried in the house, the grave is dug under the bed in the sleeping-room.

In the case of small boys and girls who are buried in the bush no cowries are thrown but the relatives lament.

If the body cannot be recovered, they go to the road along which the dead man travelled last, take any piece of stick and throw it on the ground. It is then covered with cloth, put on a plank, and carried home. They bury it in the usual way.

Sons-in-law contribute to a funeral between £1 and £5. Sons, daughters, brothers, sisters and wives all shave and each person burns his hair on the road to the grave. In the case of small children, the parents, brothers and sisters shave only if the dead child had teeth.

The head is shaved differently for different relatives. On the right side for the father, on the left for the mother, and the whole head if both die. If the parents are dead, the whole head is shaved for a brother, otherwise only the middle, and the same for a sister. The father shaves the middle of his head for a son if his own father is alive. A wife shaves the whole head but leaves small patches over the right or left ears for her father or mother.

40. At Agenegbode the body is rubbed with cam-wood after being washed, and then marked with black. For a big man a goat and a cock are sacrificed in the house; cowries are put down where the body is washed. The burial takes place at 4 p.m. The grave is dug by four men, not the brothers of the deceased, and they receive a fee of cowries from the compound of the dead man. The funeral is attended by all children, brothers and sisters, and by *amoya* wives.

Chiefs act as bearers to chiefs: married men are carried by boys who have not yet joined an *otu*. The body is covered with wood; cowries are thrown in the house and there is no sacrifice. Bearers and mourners wash their hands when they return and the bearers sometimes wash all over; they all remain at home for five days after the funeral. The sons-in-law bring drums and cowries, bananas, yams and palm-wine, but no cloth.



If a man dies away from home his body is fetched ; if the body is irrecoverable his name is called on the road, oil palm leaves are brought and buried in the usual way. *Isomi* children or an *isomi* wife are sent home to their family to be buried.

When a man dies his wife and children rub themselves all over with chalk or yellow pigment. They wash and the property is divided in three months. At some period *amoya* wives swear at the grave not to run away. There is no second burial, but the family shave their heads in fifteen days. Sons, daughters and brothers shave the whole head. An *isomi* wife shaves at once ; an *amoya* wife in three months ; sisters leave a patch on the right of the head if their father is still alive. At the end of the fourth month they wash at the waterside.

41. At Opepe in the Ibie country, Kabba<sup>1</sup> Province of Nigeria, in the case of an old man his son summons the big men of the town. He takes 1200 cowries for the man who has a long drum (*ikpabe*), brings the drum home and beats it to announce the death ; the old men sit down with a calabash before them. The grave is dug under the man's bed. The sons and other members of the family bring cowries and put them in calabashes. The women have their own drum (*okidegba*), and the old women sit down with a calabash in front of them. Sons-in-law also come, fire guns and put cowries in the calabashes.

A masked man called *Ilo* carries a thin stick, and walks through the town, driving away the small boys and girls, who say that "the dead man has come out." Each boy or girl throws one cowny to him, and *Ilo* picks them up. The burial takes place on the day of death, or for a very old man with a big family on the second day.

After the burial they play *igbedo* ; all men of the town take guns and act like men who go to war ; on the same day another dance is announced twelve days ahead. The sons make *pito* of guinea-corn, and bring a dog, a cock, a he-goat and some good cloth. The cloth is put on the roof of the house ; they get three long sticks and put it inside the cloth, so that it looks like a body. The head is covered with a cap, beads put on the neck, and feathers of the African pheasant (*iloko*) are put round the head. Two men carry this figure on their shoulders, and all march round the town to the sound of the drum. Cowries are thrown, and they say that their father is going to *climi* to-day.

The same night the cloth that has been put upon the roof is taken down. The cloth figure, called *ukpakpa*, or body is taken to the house, and they play *ofo*. They dance and sing, and act as if they were going to cut people's heads ; a dog's head is cut off, two men holding it by the head and feet ; the man who kills it first hides, then runs by ; he must sever the head at one stroke. A cock and a goat are sacrificed in the same way ; the necks go to the men who imitate warriors ; the meat goes to the big men. After this the body is dismembered, and the sticks thrown away.

<sup>1</sup> For another account see C. Temple, *Notes on the Tribes, Cape Town, 1919.*



An old woman is buried in the same way as an old man; a girl who has been married at least three years is buried with less ceremony, but her company play *iyedo*; an unmarried girl is buried and lamented; babies are buried in the house. In five days the customs are finished, and the sons, daughters, brothers, sisters and wives wash at the waterside. They shave their heads, get black and white thread and tie it round their wrists, waists, necks and ankles; these are worn for three months, then cut off and thrown away at the cross-roads.

42. At Kominio, in the Upila country, the family assemble and lament for a man; a drum is brought, and they dance before the body in the house. A grave is dug partly outside the house, partly inside; cowries are put near the grave by the family, and the diggers take them; a mat is put in the grave; the body is washed, rubbed with cam-wood, and put on a mat outside. The family bring cloth, put the body in the grave, and the cloth on it; short sticks are then cut and put across the grave on the mat, and the grave is filled in. For a big man they can dance five days and they play *ofo*. For the chief of the town a cock, a dog and she-goat are brought to the grave and sacrificed by hitting their heads on the ground; the meat goes to the male dancers; any man who wears small bells on his waist can have *ofo* (dance) played for him, but it cannot be played for a woman. Children are buried by the family only; wives, children, etc., wash five days after burial and shave; they tie thread as at Ibie.

43. At Soso, the inhabitants of which were originally fugitives from Nupe raiders, the body is washed on the second day. The first day is taken up with lamentation and dances; the drummers receive 4000 cowries, and farmers or hunters have special dances; at daybreak all the family assemble and take the body out; males are washed by males, females by females. The grave is dug in the house outside the door of the room—for a big man in the middle of the room. Children bring cowries for the grave-diggers.

The head son brings a good mat; sons-in-law, brother-in-law and other members of the family bring one cloth each; these are all put together, and the big men of the house are summoned; sons bring out the cloth which belonged to their father, and divide it into two portions, if there is much; some of their own cloths are added to one portion, and all put in the grave with the mat to cover the body. The corpse is put in the grave by the sons-in-law or brothers-in-law, covered with half a mat and then with earth; grave-diggers and bearers go to the cross-roads to wash; if they fail to do so they would fall sick in a few days. The reason given to me for their washing was that they had touched new ground, but it appeared that they only washed if they put a corpse in the new ground.

On the next day two calabashes of food are cooked and the sons take them to the grave, call the name of the dead man, and put down some of the food; this, together with what remains in the calabashes, is eaten by small boys, and the ceremony is repeated four times; on the fifth day eight calabashes are cooked and



eaten by the family. In five days more all the family shave. The widow cannot marry for a whole year.

Before the burial the man's cap, gown and other garments are taken and put on three sticks, two vertical and one horizontal, and then placed on the roof. This figure is called *mamači*, which seems to mean evil spirit. On the day of the burial it is taken down; all small boys and women are driven away and the sticks thrown away.

If a rich woman dies they take a calabash which she used for trading previously, put cowries round it, cover it with red cloth. If she has a daughter-in-law she takes the calabash, walks round the town, jumping about and shaking her head; old women dance after her. Anyone who has received benefits from the deceased walks round and the family throw cowries. Babies are thrown on the dust heap, as are any children whose teeth have not been filed. If the body cannot be recovered sticks are cut and cloth tied on them; these are carried round, and they dance and bury them like any other body.

44. At Semolika, about one day's march from Okpe, for a big man, all boys dress as warriors, take guns and fire them. The son announces the death to the big men of the town and the wives and sons lament. Goats and cloth are brought by sons, daughters and sons-in-law. The body is washed and the grave dug by anyone who is not a member of the family; *ifa* divination, is employed to decide whether it shall be in the room or outside. Witches are buried in the bush.

An alternative method is to cut seven mid-ribs of the palm and take them to the body; cloth is put on them and two men carry them; they are used like *ifa* (palm-nut divination) to say where the body is to be buried.<sup>1</sup> Before the burial takes place the mid ribs are thrown away and the cloth used for the body. As at Soso, the cloths brought by the sons and those of the dead man are divided and about one-half used. The grave is dug with a side chamber and a piece of wood put to prevent the earth from coming into contact with the body; the grave-diggers wash at home or at the waterside. Goats are killed outside the man's compound; each of the three quarters takes one, and the family takes one. The sons and daughters cook food on the same day, and take it to the grave; some they take with two hands, call the dead man's name and offer it and eat the remainder. A pot of *pito* is taken to the grave also and some poured on the grave. Nine days later sons and daughters and wives shave and dress, dance from the house to the market-place and throw cowries. The widows put black thread on their necks, which is worn for one year; they are free to go about as they please, but must observe continence. After one year they shave and cut off the thread, rub cam-wood and mark the body with black stuff; the thread and the hair are thrown on the ash heap. After this they are free to marry.

<sup>1</sup> The more usual form is to divine who has killed the deceased.



A woman is buried in the same way as a man, but no war dress is worn. Small children are buried by the family, small boys by their own company, small girls by their family. When a girl dies the mother will sometimes try to commit suicide; she asks people to dig a grave for her, and hits her head against a stone; she does not answer salutes and refuses food.

45. At Ibilo the death of a big man is announced to the king, who sends his own messenger to inspect the place of the grave, which is inside the room under the bed; hired grave-diggers come on the same day. The women of the family wash the body, rub it with cam-wood, and put it on a mat; all the family bring cloths, some of which are added to the dead man's property, a few are subtracted and the rest used for burial. The body is simply covered with earth and a dog killed on the grave and is eaten by the sons. The sons dance till the next day and the widows and family lament for five days. The grave-diggers wash at the waterside and receive 10,000 cowries (*i.e.*, 2s. 6d.).

When the widows and family shave, the hair is put on the grave and subsequently burnt; then they wash, rub themselves with cam-wood, put white thread on their necks and keep it there till it comes off; a widow is not prohibited from taking a husband while the thread is still on her neck.

A woman is buried like a man, but a goat is killed for her; childless people are buried in the same way; youths are put in a hole at the back of the house; small children are thrown in the bush. If a man dies far away, banana sticks are taken to represent him, cloths put on them and they are buried, with the usual sacrifice of a dog.

46. At Isua, close to the Yoruba boundary, the head man of the quarter is informed of the death; he tells the sons to dig a grave, and the big men of the quarter sit down in the house. The sons-in-law bring one goat and one cloth each; the sons also bring cloth, but the dead man's property is not brought out. If there are too many cloths provided, some are put aside, which the head son takes. The body is washed by the family, cam-wood rubbed on it and cloth put over it. The boys of the compound dig the grave and act as bearers, while the sons look on; they also have to get wood to cover the body and fill in the grave. A goat is provided by a son-in-law and sacrificed on the grave; this is cooked and eaten; the widows do not participate.

In five days the sons and daughters shave; the widows lament for three months before shaving; the family do not wash, but it is obligatory on the grave-diggers. After the burial they dance till daybreak and on the next day the burial dance (*agbara*) is performed twice; a dog is also killed so that the grave may be smooth for the dead man; the son sacrifices it and the head must be cut off at one blow.

Burial dances are repeated in later years; I saw one for a hunter during my stay at Isua. The first act was for boys to run through the compound with green branches; then a figure dressed in red with a net mask appeared and danced;



skulls of animals were placed on the ground and the dancer took a gun and pretended to stalk them. He caressed the daughter of the dead man, and as he was leaving the compound a dog was sacrificed, and he stepped over a line marked with its blood.

The Kukuruku of some of these areas have a tradition, probably well-founded, that they are descended from Sobo, who left the habitat of their tribe, south of Benin City. I now turn to the Sobo customs.

47. At Sapele, the body is washed with soap, put on the bed, and covered with a white cloth; guns are fired. The son sacrifices a goat to his father's feet and they dance all night.

On the second day the corpse is buried in a grave dug by the sons-in-law in the man's own room. Anyone in his father's or mother's family or his own family may come to the funeral. The sons-in-law put him in the grave, cover him with white cloth and throw cowries; the head son kills a goat, of which all eat; the bearers wash. Dancing goes on for seven days; the sons then shave their heads, unless they are big men; then all wash themselves and their clothes.

48. At Okwolofo the body is washed and put on the bed. The dead man's father's and mother's families join with the whole town and dance all night; a goat is sacrificed to the dead man's feet by the head son and eaten by the family; no one may go to the bush for seven days. The sons-in-law dig the grave and dress it with the cloth provided by the head son. Food is cooked without salt (*imweve*, food of corpse), and put in the grave near the head; plantain is mashed with oil and put near the feet.

Two old men of the town come and look at the grave; the head son goes too and asserts that the grave is not right; when this has been repeated once or twice, the head son says it is all right; the body is then put on the grave and earth thrown on by the head son; the head son and the last child must buy a goat or a bullock to sacrifice to the father.

The sons, the rest of the family, and the sons-in-law dance for three nights; two goats are killed on the grave: one by the head son, another by the last child. In seven days, sons, daughters, brothers, sisters and wives shave their heads and throw the hair in the bush. All wash, as do also the grave-diggers and the head son after the funeral.

49. At Eferun the body is put in a chair and washed; a goat is sacrificed outside the house and the body dressed and put on a bed. The father's and mother's families dance for two hours. The sons-in-law dig the grave and the daughters and sons bring cowries and put in it; the sons-in-law put the body into the grave; food is cooked without salt and put on a plate in the grave; the grave is then filled in and the earth smoothed down; more cowries are put on it and the grave-diggers wash.

In three days sons and daughters, brothers, sisters and wives shave their heads. The head son does not shave upon the same day, but waits till the property is divided



three months later. A married woman is buried in the same way as a man; for unmarried people no cowries are used; a bullock is sacrificed in the house for a rich woman.

50. At Ajeyubi a chief's body is washed in the back of the house. A long fish-trap is made to measure, a white cloth put on it and the body put inside; sons and sons-in-law dig the grave inside the house; the family meet, and put cowries on the trap; then the head son sacrifices a goat bought by the whole family; the family attend the funeral with the exception of the head son. On the second day the head of a bush buck (*crua*) is obtained and the family is summoned by sounding one of the horns. The daughters and sons wash and shave, but not the head of the family, nor the father nor mother. In seven days a dance (*crunimi*) is held and again fourteen days later. A drum is beaten and after three days a goat is killed on the right hand of the door or on the threshold. Women and children are buried in the same way, but for children there is no sacrifice.

51. At Ugeli village the chief or king is buried as follows: A big tree is cut down, hollowed out and taken into the town; it is then dressed with white cloth and silk put under a small shed with a small fire in it and the body put in it; then they wait for three years.

On the day of the real burial the town is summoned; the grave is dug in a room (*ogwa*) and the canoe and body placed in it; after the grave is filled in, the head son kills a bullock on it, which is eaten by the town and all the family. The whole town dances for a month and abstains from going to the bush or to market; till the body is buried the head son is not deemed to have succeeded. Then he goes to his father's house, gets five of the small girls, not yet fully married, and twenty of the older wives.

In the case of an ordinary man the head son summons the family on the first day and the body is washed at the back of the house. A big mat and a cloth are brought and the body rolled up in the mat and sewn; the sons dig the grave in the house; two of the townspeople hide in the town; this is called "going for *juli*." One of the townspeople says the grave is not right; it is then dug deeper and the second man says the grave is right; the body is then put in, the grave filled in and smoothed. A goat is sacrificed on the grave and eaten by the family; a second goat is killed for the dead man's hand on the step of the house.

On the second day a dance is announced for the following day; the head son makes a table with white cloth on it, in front of which the dance takes place; the dancing is called *eruele*. Dancing may go on for three days, during which the sons and daughters who are the eldest children of their mothers kill goats, which are eaten by the dancers and by the family. They dance seven times round the town, singing any song which they please; it is not forbidden to go to bush or to market. A woman is buried in the same way; childless people are buried by the family and the sacrifices are performed by the head of the family; in each case the grave-diggers must wash. When the customs are over the whole town has to shave, if the king



has died ; sons and daughters, wives, brothers and sisters for an ordinary man ; the sons for a woman and brothers and sisters for childless people.

52. At Ewu water is boiled and the body washed in front of the house. A mat is spread on the same spot and covered with white cloth ; the grave is dug in the room (*ogwa*) by the sons-in-law, who also put the body in the grave ; they wash and receive one goat. On the same day the burial dance (*erá*) is arranged ; it takes place three months later and lasts for three days. The family shave and wash. On the day of the burial a sacrifice of fish is offered on the grave, not by the son, but by the family ; the sons and all the town eat. If there is no son or brother the family undertake the burial.

53. At Ugo village, not far from Ewu, the house is shut up when a man dies ; all the children lament and the head son goes to the head of the town and informs him. The town meets together and two men are sent inside the house with the son and two of the family ; then the door is opened and the body is taken to the back of the house ; the two townsmen, with the two men of the family, hold the head and feet ; the body is put on the top of a box and washed by these four men ; the head son only looks on. After being washed the body is carried inside the house and the head son dresses it in white cloth. The town and each member of the family bring pieces of white cloth and the body lies on the bed till daybreak. The grave is dug by the sons-in-law and the family, and they also put it in the grave. Three months later a dance takes place and a goat is sacrificed by the head son.

54. At Iyede, when the head of the town dies, the body is put on the bed and left. The family summon the townspeople and the sons-in-law to measure out the grave. The father of the dead man directs that the corpse shall be taken back to the house, where it is held in a chair and washed. It is dressed in white cloth and white feathers (*ugolobata*) put on the left-hand side of the head. A goat is provided by the family and sacrificed by the head son and eaten by those who have washed the body ; the head is preserved. The head son inspects the grave and shouts in the town that it is all right ; let the washers come and put it in the grave ; this is done and the grave is filled in and smoothed. A dance is held and the head son announces the second burial for seven days later. The head of the goat previously sacrificed is tied with a piece of string and a son-in-law carries it round the town, calling the people to the dance. At daybreak all is over, and all the children, brothers, sisters and wives shave. Ordinary men and women are buried in the same way ; childless people are buried by their brothers-in-law, if they have any ; small children are buried in the bush.

55. At Agbasa, when the head of the town dies, the head son announces his decease to the head of the family, the head of the family to the big men of the town. The family meet, drink and dance all night. Next day the sons-in-law dig the grave in the man's own room ; the body is seated in a chair outside and washed by the big men ; a mat is put down and the body placed on it and dressed with white cloth. The head son inspects the grave, into which cowries are thrown ; the sons-in-law



carry the body, aided by the big men, and place it in the grave; the women of the family are present. Those who wash the body and the grave-diggers all wash, and eat a goat sacrificed where the body was washed; another goat is killed on the grave and eaten by the family. At daybreak a dance is announced, to which every one comes; the wives, brothers and sisters shave. For an ordinary man or woman the washing is done by the children.

56. At Kokori the body is washed in the front of the house and put on a mat. The grave is dug by the mother's family and cowries thrown in; the body is then put in and the grave filled in and smoothed; the diggers wash their hands and the head son kills a goat on the grave, which is eaten by the father's and mother's family.

If the sons have plenty of money the dance is held at once, if not they may wait two or three years. A canoe (*oko olimie*) is put upon a box and dressed with cloth; and they dance in front of it; when all is over it is buried inside the house; a bullock is sacrificed on the same day and the son gets the foreleg. The hole in which the canoe is buried is in the *ogwa* and is dug by the sons-in-law; where the body cannot be recovered the canoe is buried in the same manner. The head son must not shave his head till the dance takes place; the rest of the family shave at once.

57. At Okpara the head of the town is informed, but before this the family meet. The family and people of the town take the body outside to wash and the sons-in-law dig the grave in the house. The family tie cowries on the left arm, the townspeople on the right arm of the corpse, after they have sacrificed a bullock. Each son and daughter brings a piece of cloth, with which to dress the body; the sons-in-law bring one case of gin. The day after the burial a date is fixed for the second burial. The townspeople cut a tree and make a canoe (*olimi*), in front of which they dance for three nights. Sons, daughters, brothers, and sisters shave on the day on which this canoe is made.

58. At Ovu the town meets when a big man dies and people go into the house and take the body in front of the house, where it is washed. The sons-in-law dig the grave in the house, but the body is left outside for a time; a goat is killed for the people who wash the body; a dance, lasting about an hour, is then held. After the body is put in the grave, a kid is killed on it, of which all eat. A goat is given to the big men of the town, but the grave-diggers get only drink and cloth.

For the second burial a canoe is carved by the town, for which they receive a goat and a case of gin. Two pieces of white cloth are sewn together and the canoe covered with them while it is still in the bush; two men of the family carry the canoe home on their shoulders, while the town dances and throws cowries over it; it is about two feet high and two feet long and is placed in the street. A bullock and a goat are sacrificed to it and eaten by all the town; the sons and sons-in-law dig the grave in the same room as the original one and put the canoe in it. A man without family is buried by the town; if a body cannot be recovered two canoes are made. Sons, daughters and wives shave, except the head son, who waits till he gets the property.



59. At Jese, on the Jamieson River, the son sends a message to the head man and calls the family of the dead man's father and mother. The sons and sons-in-law dig the grave, which the town must pronounce to be all right. After the burial the head son kills a goat on the grave, which is eaten by the family and sons-in-law. At day-break next day they begin to dance and go on for seven days. If the body cannot be recovered the grave is dug and three pieces of cloth put in. One goat is sacrificed.

60. At Warifi, just below Sapele, sons wash the body in the back of the house and tie cowries on the wrists. The sons, brothers and sons-in-law dig the grave in the sleeping-room, if the dead man had one of his own, if not, in the bush. After the burial a goat is sacrificed outside the house; the right foreleg goes to the father's brother, the left to the mother's brother; the diggers eat the remainder. If the man is rich, they dance for seven days from the day of the burial; if poor the sons may have to wait; on the day when the dance finishes all wash at the waterside.

The problems raised by these burial customs are much the same as those of the Ibo area, for which I suggested Indonesian affinities, without, however, suggesting how they reached West Africa. It is of course possible that both Indonesia and West Africa took their burial customs from a common source; where it is a question of mummification, of which we seem to have a well-marked survival in the washing of the body of the King of Ijebu with alcohol, there is no reason to go outside Africa for the source of the custom; as I hope to show elsewhere, mummification customs are widespread in West Africa, and are or were found as far west as Sierra Leone and the mouth of the Gambia.<sup>1</sup>

In Sierra Leone, however, mummification has been replaced by burial in a stream bed and the removal of the head or skull; we can fix the change as having taken place in the last four hundred years. If this were an isolated case of a skull cult, the importance of it would be small, even though there is clear evidence that the custom was brought by a people that migrated from the east, coming from a region at present unidentified. But when we find the same skull customs widely spread in the Northern Provinces of Nigeria and associated with the hunting of enemies for their heads, the significance of the rite is wholly different. We cannot regard it as a sporadic local development.

It is true that this skull cult is associated in some cases with a custom of mummification; but on the Gambia mummification is likewise associated with cannibalism; the body is dried and buried, then exhumed, cooked and eaten; it is quite possible that the exhumation points to the presence of a third element in the custom, the same that is seen in the head hunting. However that may be, it is clear that the association of mummification with a custom does not compel us to suppose that both came from the same source; one may be indigenous, the other imported, or both may be imported, but from different areas. This is what appears to have been the case in the Northern Provinces.

<sup>1</sup> *Ancient Egypt*, 1921, Part I, p. 7.



So far as I know, Indonesian head hunting and head cults are not believed to have been carried from Egypt; and there are, so far as I know, no traces of such a custom having taken root, either temporarily or permanently, in Egypt. If therefore we find, in a well defined area in West Africa and in Indonesia, a custom of head hunting and an associated cult of the skulls of the ancestors of a family, we may argue that both have arisen independently, or that they have been transmitted from one area to the other; the third case, of the transmission to both areas from another centre, appears to be excluded in the case before us.

The rational method of regarding the question of transmission versus convergence appears to be to take each question on its merits. It is possible to read (in German) theses on literary questions and on the problem of the influence of one poet on another, or perhaps of plagiarism by one from another; where the data involved are of the order of enumeration of the number of times each alludes to the sky as blue or the grass as green, the argument is unconvincing; the idea is not so remote, even from the mind of a poet, that two gifted writers cannot hit upon it independently; it may of course also be argued that both derived it from their environment.

Generally speaking, it appears that the question of transmission or independent development must be argued on the basis of the extent of the coincidence and the nature of the identities involved. If the elements concerned are numerous and the points of agreement many, the verdict is in favour of transmission. But where the idea is a simple one, such as the use of a curved throwing-stick, it appears as probable that more than one area made the discovery independently, as that Mexico, Egypt Abyssinia and South India received it one from another or from a common centre.

It is unnecessary to argue how far the complexity of the head hunting and skull keeping (or using, *e.g.*, as drinking vessel), is a sufficient basis for asserting that transmission is the only possible solution; for the points of resemblance between West Africa culture and that of Indonesia are comparatively numerous. It is certain that the banana has come to Africa from that area, unless we regard America as the immediate origin, so far as Africa is concerned. Among musical instruments, the *marimba*, known among the Mande as *balafé*, is found in four separate areas in Africa, two south of the Congo, one in West Africa, one on the Ubangi. I am not immediately concerned with the relation of these four areas to each other; but it is important for our purpose that the *marimba* is also Indonesian; and the same is true of other musical instruments.

There are, it is true, traces of them on the land way from Indonesia; and it would be possible to argue that it is a case of transmission of a manufactured object only; but the case of the banana is more difficult, for the edible species do not produce seeds, and it is not *prima facie* probable that it was transmitted in the form of suckers, by the land route, the more so as it does not appear to have become indigenous on the northern shores of the Indian Ocean.



The question of the relations of West African and Indonesian culture is one that involves the digesting of masses of data on material culture, especially of the simpler kinds, such as weapons, habitations and the like; and this is a work that cannot be undertaken in connection with a sketch of the burial customs of a small area. I merely draw attention to the possible Indonesian affinities of some of the rites.

So far as the Edo country is concerned, the only ceremony that comes in question is "second burial"; but this is relatively less important than in the Ibo country; at any rate I cannot lay stress upon it as evidence of Indonesian affinities.

I have called attention above to the mummification of the King of Ijeba; it may be well to point out that the chief of Ugeli is kept for three years before burial, and is prepared for his long wait by being roasted over a slow fire; when the time comes for burial, a canoe-shaped piece of wood is used as a coffin. Canoe burial is also in use for second burial at Kokori, Okpara and Ovu; at the latter place a second canoe is made when the body cannot be recovered.

It seems clear that the canoe corresponds to the Edo *oṣṣ* or *okun*, and the Edo are clear that the *oṣṣ* itself is a substitute for the dead body.

It seems therefore possible that in all these cases we have to do with a rite that was originally the disposal of the bones after they were exhumed; it is clear that the widespread Northern Provinces custom of exhumation makes this explanation immensely more probable than it was when I first suggested it in connection with Ibo second burial customs.

In connection with the use of the canoe, which seems to be confined to the Sobo country, it may be well to note that there is evidence of Ibo influence in the Sobo language, and that the Igabo, a section of the Sobo, are in the immediate vicinity of the Ibo on the east of the Niger. It remains to allude to the *nodirai* custom, which belongs to a different cycle and is perhaps connected with the belief in the *ehi* (*Edo Report*, I) and the secret societies of the Yoruba area. It may also be argued that this rite has been substituted for the custom of keeping the corpse itself, dressed up in its finest garments, in the house as a witness of the funeral rites in whose due performance it is so interested. The difference is not very great, ultimately, for it is clear that the rites are now connected in both cases with the ceremonies having for their object the recalling of the spirit of the dead man to the shrine where the cult of ancestors is practised, possibly as an outcome of the reincarnation creed, which comes out so strongly in the burial songs quoted on p. 382.

The music of the burial songs has not yet been reduced to our notation, and there are other records of birth songs, the Ovia rites and so on, which are equally deserving of detailed treatment at some future time. But the question of the relation of the type of music to the nature of the rite is very clear in some of the burial songs, though a trochaic rhythm often makes its appearance, as a result of the need for keeping together the groups forming the procession, which is in Benin City formed by men

and women separately ; the singing of the women, all the voices joining in without any conductor like the most perfectly trained choir, and without a shade of hesitation as to the opening note, is extraordinarily impressive and beautiful. There is one song, however, that is specially appropriate to the occasion and would be recognized as a dirge anywhere ; it begins with a perfectly tuned fall of a major third.

In some of the burial songs there is a kind of rude harmony, but it is not possible to say how far this is intentional. But in *ogimesse*, a melody used in a boys' game, there is a kind of plainsong, clearly harmonized with major and minor thirds, which the natives recognize as specially beautiful ; it is very probably a relic of Portuguese influence ; but the Gwari of the Northern Provinces have also chants of the same kind with four parts harmonized.

I heard a certain number of burial songs in the Ibo area ; but, so far as I can recall, they were not universal as in the Edo area, and this suggests that some of the burial ritual was modelled on Portuguese ceremonies. In this connection it may be recalled that less than a hundred years ago a crucifix was carried round, in the neighbourhood of Wari, at Christmas, though there was no discoverable Christian element in the ceremony.

The question of the European element in the rituals of West Africa is a wide one, and the data on which to found conclusions are few. I will not therefore do more than point out that however little result the missionaries of the sixteenth century seem to have produced, they have at least left evidence of their influence in externals, and we must be prepared to consider, when we analyse the culture of West Africa, how far some of the ideas and rites are due to direct but comparatively remote importation from Europe.



# ON THE IMPLEMENT-BEARING DEPOSITS OF TAUNGS AND TIGER KLOOF IN THE CAPE PROVINCE OF SOUTH AFRICA.

[WITH PLATE IIA.]

By NEVILLE JONES.

## (a) TAUNGS.

TAUNGS, the chief town of the Battapiñ tribe of the Bechuana, is situated on the main line to Rhodesia, 80 miles north of Kimberley. The native stadt is 4 miles east of the railway (Fig. 1). Quite close to the London Mission House at the eastern end of the location and between two kopjes is a deep kloof that was, only a few years since, little more than a ditch. It is said to have been possible to step across it twenty years ago, but the rate of erosion has been so rapid that it is now 25 to 50 yards across. Having carried away the soil and subsoil, which below the Mission House averages 9 feet in thickness, the river has cut through a bed of marl containing thick lenticular beds of pebbles and boulders loosely cemented together. While many of the pebbles are well rounded, there is a quantity of angular and subangular fragments of quartzite, diorite, and other rocks in great variety.

These pebble beds are by no means uniform in thickness, but vary from a few inches to as much as 8 feet towards the confluence with the Harts River, where they are distributed over a wide area. The force of the storm-water has in some places entirely removed the marl and laid bare the country rock; but occasionally, where protected by large boulders or favoured by a change in the direction of the stream, it can be seen well exposed over large areas, and can always be studied in section in the banks. In some places the pebbles have been dislodged from their original position and collected in heaps or spread over the river bed. The erosion of the banks is still progressing at a very considerable rate, and many tons of soil fall into the stream annually.

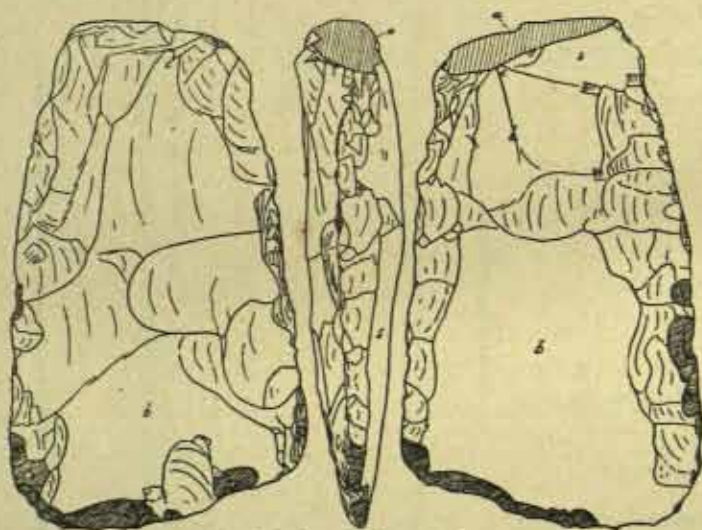
The diagram (Fig. 2), illustrating the section across the river bed at right angles to its general direction, will serve to show its present condition. Between the hill slopes to the east and west is a wide flat of river mud 9 feet thick. This contains no stones, but is full of small soft calcareous nodules. Below it is the marl with a thick pebble bed resting on country rock (4 feet). The hill-slopes on both banks are thickly covered with stones and boulders, amongst which are to be found a number of fairly modern Bushman implements of crude finish. Rough flakes are numerous, but very few exhibit any secondary chipping.





On first entering the river bed I was at once struck with the abundance of flakes of indurated shale and quartzite lying in it. I was not long in finding a large pointed hand-axe, and systematic search during the succeeding week provided me with a large collection of implements in great variety. I had soon to relinquish collecting all I found, and was obliged to content myself with the finest and most instructive specimens. The rejects included a quantity of waterworn implements, of which many retained little but their general shape. Practically all the hand-axes are more or less waterworn, though the extent to which the wearing has taken place is generally dependent upon the material used. That the rolling took place previous to their deposition is evidenced by the condition of those I obtained *in situ* from the face of the section.

I have had some difficulty in selecting, from the large number of implements collected, those that will best serve the purpose of illustration. I have, however,



*Fig. 3.—Axe-shaped implement from  
Tawmge: a Bulb of Percussion  
surfaces of original flake. The shaded  
portion of the edge has been re-chipped  
c The bulb of percussion*

FIG. 3.—AXE-SHAPED IMPLEMENT OF DIORITE.  $\times \frac{1}{2}$ .

endeavoured to figure the most representative types, though these by no means exhaust the variety of their shapes, sizes and degrees of workmanship.

The axe shown in Fig. 3 is the most remarkable in the assemblage, and might well have been a hafted implement, judging from its shape. It is made from a large diorite flake, and has been carefully chipped round its entire edge except at the narrow end, where the large flat platform (a) has been left intact. A well-marked bulb of percussion (c) can be seen on each side, while the unchipped surface of the original flake remains at the areas indicated (b). At some time subsequent to its manufacture it has been re-chipped in places, especially along the broad

cutting edge opposite the butt, which edge has been chipped obliquely. The re-chipping has made it more oblique than it originally was, though judging from the only other implement I found of similar shape but cruder workmanship, I imagine it to have been an original feature. The chipping throughout has been carefully and boldly done, and the edge is fairly even. Its length is 7.2 inches, its greatest breadth 4.6 inches, and its thickness 1.5 inches. It was found lying on a heap of shingle in the river bed just below the Mission House.

The pointed hand-axe (Fig. 4) is of quartzite and has been carefully chipped over its entire surface. It is symmetrical in outline, and the front represented in



*Fig. 4. Pointed Hand-axe, Taungs.*

FIG. 4.—QUARTZITE HAND-AXE.  $\times \frac{1}{2}$ .



*Fig. 5. Oval flake implement from Taungs = Butt & Butt of previous.*

FIG. 5.—FLAKE IMPLEMENT OF DIORITE.  $\times \frac{1}{2}$ .

the diagram is well rounded, but the back is thick and more convex. An effort was evidently made (at *a*) to improve it by the removal of a chip, but without success. The sharp and nearly even edge is continuous all round, but the point has been broken off. Probable length when perfect, 6.4 inches; thickness, 1.9 inches. This somewhat slender-pointed type is comparatively rare, four similar specimens only having been obtained.

The special interest in Fig. 5 lies in its possessing every appearance of having been struck off a "tortoise core," large specimens of which I noted at Taungs.



It is of black diorite and is chipped all over on the front face, while the back presents the usual slightly concave flake surface and prominent bulb of percussion. The slight amount of chipping on the back suggests that it was only done to obtain a symmetrical outline. The large butt has two facets. Length, 5 inches.

The quartzite hand-axe, shown in Fig. 6, is suggestive of a celt in general appearance, and represents one of the many intermediate forms. It was obtained *in situ* from the middle of the pebble bed shown in the section, and is considerably waterworn. While the edge is fairly regular, the chipping, especially on the back, is rough and uneven. Length, 4.9 inches.

Fig. 7 is a quartzite hand-axe of sub-triangular shape. The chipping is uniformly good throughout. The edge is continuous and even, except where interrupted by the large lateral butt, and the faces are equally convex. Length, 4.3 inches.

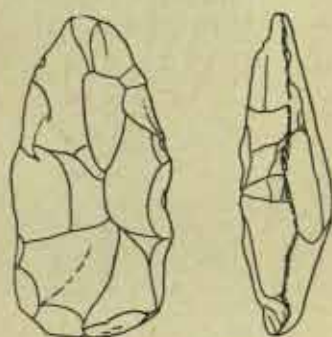


Fig 6 - Celt-shaped hand-axe  
from Taungs

FIG. 6.—QUARTZITE HAND-AXE.  $\times \frac{1}{2}$ .

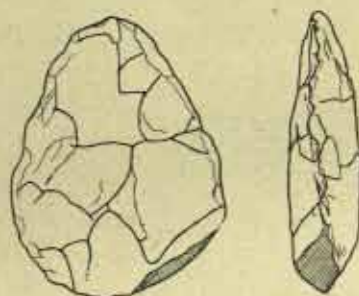


Fig 7 Sub-triangular hand-axe  
from Taungs

FIG. 7.—QUARTZITE HAND-AXE.  $\times \frac{1}{2}$ .

Fig. 8 shows five characteristic types of hand-axes. No. 1 is an oval implement fashioned from a diorite pebble, and retains the original crust over the greater extent of its back. Length, 5.4 inches. No. 2 is of a fine-grained banded rock, finely though irregularly chipped, with a fairly even edge all round, but a badly-formed point. Length, 6.1 inches. No. 3 is a pointed oval implement of quartzite, much waterworn, and is, with No. 2, illustrative of the shape and size of the majority of the Taungs hand-axes. Length, 6.9 inches. No. 4 is a somewhat rare lanceolate form, boldly chipped on both sides, and with a sinuous but sharp edge all round. Length, 4.7 inches. No. 5 is of black chert, sometimes spoken of as lydianite, which admits of finer workmanship than the coarser-grained intrusive rocks. It is oval in shape and is worked to a blunt point. The edge is even and continuous, except at the butt, where there is a large four-sided flat platform. Length, 3.9 inches. From the material used and the freshness of the specimen I think it may possibly be of a later culture. I have found only two other chert hand-axes.

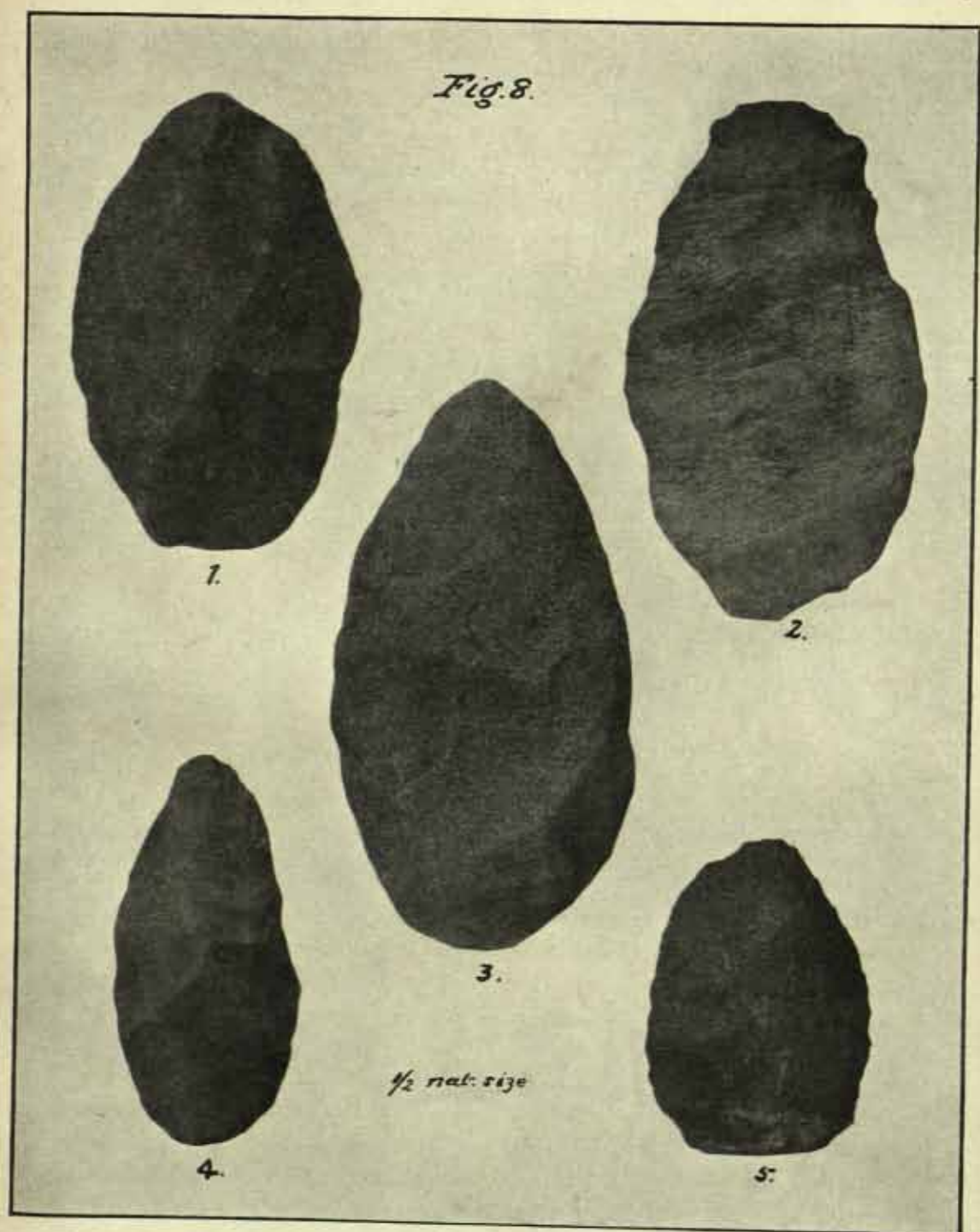


FIG. 8.—CHARACTERISTIC TYPES OF HAND-AXES.  
ON THE IMPLEMENT-BEARING DEPOSITS OF TAUNGS AND TIGER KLOOF IN THE CAPE  
PROVINCE OF SOUTH AFRICA.

[To face p. 410.]





The flakes in Fig. 9 are found throughout the pebble bed in association with the hand-axes. Unlike them, however, they are generally unwaterworn; and even those of indurated shale, which is easily rounded by attrition, are many of them as fresh as though but recently struck off the core. They present little evidence of having had secondary chipping, but appear to have been used. As will be noted later, I believe that most, at any rate, of these are of later date than the hand-axes, the least worn of which may possibly have been contemporaneous with the flakes. Nos. 1 and 3 are of indurated shale; 5 and 7 of diorite; and 2, 4 and 6 of quartzite. The backs show simple flake surfaces with bulbs of percussion.

At the top of the pebble bed, and extending to a depth of about 6 inches, there is an abundance of chips of chert and shale, amongst which I found a few small

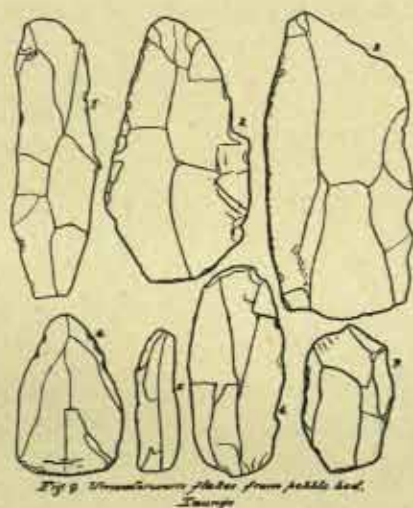


FIG. 9.—WATER-WORN FLAKES FROM PEBBLE BED.  $\times \frac{1}{2}$ .

implements exhibiting a high degree of finish, and of specialized character. Some show secondary chipping far superior to anything found at a lower horizon. I was unable to find any chert chips at any lower depth in the pebble bed.

The best of these implements from the top 6 inches of the pebble bed are shown in Fig. 10, and their resemblance to Mousterian implements will be noted at a glance. Nos. 1, 2, 3, 4, 6, 7 and 8 are of chert, and No. 5 of indurated shale. No. 1 is a well-made point with some rough secondary chipping. No. 2 is untrimmed. No. 3 is a roughly discoidal scraper, chipped on both faces, and is very convex on the upper. Nos. 4 and 8 are broken points carefully worked. No. 5 is a long thin point broken towards the butt-end, and exhibiting considerable technique. It is finely worked on both edges. No. 6 is a round-edged scraper, the chipping of which has curiously enough been done at the butt-end. No. 7 is a curved-in scraper or spokeshave. All, with the exception of No. 3, show the flake surfaces beneath.



The implements shown in Fig. 11 were collected in the actual river bed, having been washed out of the pebble bed, and I cannot therefore determine with any accuracy their position in the series. As I have been unable to find any such highly-specialized types in association with the hand-axes, I am disposed to assign them to the top 6 inches, but I do so with reservation, lest subsequent investigation prove me wrong. They are all of diorite, or possibly very hard shale (it is difficult to tell which). No. 1 is a side scraper with well-formed curved edge. No. 2 is an end-scraper, after the style of La Madeleine. No. 3 is a combination scraper chipped all round to a sharp edge. No. 4 is a curved scraper (point worn off) trimmed round except just at the butt. All these are chipped on the top side only. The discoidal scraper, No. 5, has been trimmed both back and front, except for the central area of the back, which shows the red crust of the original pebble, and has a fairly even edge, except at the butt where it is unworked.

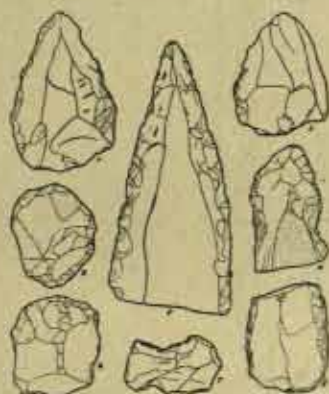


Fig. 10. Flake implements from top 6 inches of pebble bed Taungs.

FIG. 10.—FLAKE IMPLEMENTS FROM PEBBLE BED.  $\times \frac{1}{4}$ .

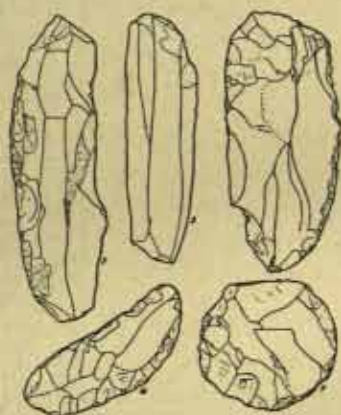


Fig. 11. Flake implements collected from river bed at Taungs; probably derived from upper part of pebble bed.

FIG. 11.—FLAKE IMPLEMENTS.  $\times \frac{1}{4}$ .

The first problem which presents itself in connection with the Taungs station is, how comes it that we find in the same river-drift rolled hand-axes associated with little-worn and delicate flakes, which can hardly have been subjected to the same conditions; further, how are we to account for the sharp and distinctive implements (Fig. 10) found at the top of the pebble bed?

Dr. Péringuey<sup>1</sup> states that "no definite proof has as yet been forthcoming . . . that the small rude implements used here (in South Africa) until a few years ago were not utilized contemporaneously with the large, roughly- or finely-trimmed, tongue- or almond-shaped implements." While here at Taungs we find no association of recent Bushman implements with hand-axes of early palæolithic types,

<sup>1</sup> *The Stone Ages of South Africa*, p. 1.



we find, in close association with these latter, a quantity of flakes. This at once suggests contemporaneity, which I should have less difficulty in accepting if the hand-axes and the flakes bore evidence of having been subjected to similar conditions. But while the former have for the most part been rolled about considerably, the flakes are to a great extent but little worn or fractured. One cannot help feeling that the force that rounded a quartzite hand-axe into a pebble would have reduced to powder a thin and delicate shale flake. The presence of hand-axes and flakes in the same bed seems to be, here at Taungs, capable of explanation only on a theory of the re-deposition of the pebble bed, and I think one would be justified in drawing the probable conclusion that while the makers of the flake implements were living, a similar process was taking place to that which is taking place to-day. The original hand-axe bearing gravel was being eroded and re-deposited, not, as was probably formerly the case, in a rushing grinding torrent, but in a wide stream that filled the whole valley, and emptied itself into a large lake occupying at least the present Harts Valley. This stream, at first flowing swiftly when the hand-axes were swept from their original position, and were re-deposited in the river bed together with the flakes of the succeeding culture, gradually lost its force as the lake into which it emptied became fuller. This process probably occupied a period sufficiently long to see the transition from the first rudimentary flake implement to the specialized implements at the top of the bed (see Figs. 9 and 10). At length the river ceased to exist as a flowing stream and became incorporated with the lake, and we find its pebble beds sealed with thick mud, such as we should expect to find on a lake bottom. The mud, though probably once present over the whole area of the Harts River Valley, has been removed in the course of the extensive erosion that took place subsequently. That, at any rate, is how I read the former history of the Taungs deposits.

It is thus probable that we have at Taungs evidence of four successive periods of prehistoric occupation, which might thus be tabulated:—

*4th Period.*—Rude Bushman implements and chips scattered about the hill slopes.

*3rd Period.*—Specialized implements, principally of chert, exhibiting careful secondary chipping, found in the top 6 inches of the pebble bed.

*2nd Period.*—Slightly and unwaterworn flakes and scrapers of diorite, indurated shale, and quartzite, and possibly some hand-axes, found throughout the pebble bed.

*1st Period.*—Waterworn hand-axes of all shapes and degrees of workmanship, and possibly some flakes, found throughout the pebble bed.

Another problem, more specially of geological interest, arises. How are we to account for the re-erosion of the valley after the lapse of the considerable period since the final deposition of the mud that sealed the implement-bearing marl?



I suggest the following probable explanation. After the deposition of the pebble bed, when the mud flat was laid down, the original river ceased to exist, except as a small gully that carried off the rain-water from the contiguous high land. Now, after the lapse of many centuries, the re-excavation of the valley has begun and is continuing at a rapid rate. The only explanation is, I think, to be found in the changing rainfall of the district. Within the memory of the middle-aged inhabitants the district was thickly wooded, and the rainfall was well distributed and sufficient. At the present day there are no trees other than the insignificant few that have been planted by Europeans, which in no way replace the millions of camel-thorn trees cut down by the natives, and used in the Kimberley mines. The veldt now contains nothing but low scrub, and the rainfall is so small that it is but rarely that a harvest is reaped. The small amount of rain that falls is no longer spread over the whole wet season, but is practically confined to a few torrential showers at the beginning of the summer. The terrific force of these storm-waters carries everything before it, and one such storm will completely alter the character of the river-bed. The spruit contains no pools, and is practically dry through the greater part of the winter.

(b) TIGER KLOOF.

When at Tiger Kloof two years ago I picked up a large oval palæolith on a freshly-gravelled path, and, on visiting the pit from which the gravel was obtained, I found a number of other examples. I also found, in a stratum overlying the gravel, a quantity of small implements, mostly scrapers of various types, presumably early Bushman.

Tiger Kloof, the institution of the London Missionary Society, is 7 miles south of Vryburg on the main line to Rhodesia (Fig. 1). It is situated on a small spur on the eastern edge of the escarpment of the Campbell Rand Dolomite, known as the Kaap plateau. The weathered surface of the dolomite is everywhere exposed, and, in scattered spots, small shallow pans of ferruginous gravel occur. These are seldom more than 2 or 3 feet deep, and their origin is somewhat obscure. The manner of their occurrence in small saucer-like depressions in the dolomite on the summit of the hill, considered together with the existing river system of the neighbourhood, makes it difficult to assign them, with any degree of certainty, to the present stream that flows along the kloof to the east of the institution. This stream has excavated for itself a deep bed in the dolomite, and, except for these small isolated gravel pans, the slopes of the kloof present no evidence, so far as I have been able to ascertain, of the former existence of any river terraces; but I am convinced that there must once have been terraces of which these pans are the sole existing remnants. On no other thinkable hypothesis can they be explained. Pits have been opened in three places, and though they are considerably overgrown, it is still possible to observe the nature of the deposit, which from its position on the top of the hill is evidently of very great age.



The section shown in Fig. 12 was measured in a trench in one of these gravel pans on the west side of the railway at the north end of the institution, and may be regarded as typical. A pebble bed, 2 feet thick at this point, is seen resting on the weathered surface of the dolomite, and contains numerous fragments of the country rock in a crumbling condition. Quartzite pebbles, many of large size, predominate, but there is also a considerable quantity of fine-grained cherty rock of light colour. The gravel is not invariably constant in character, and is represented only by isolated pebbles at the southern edge of the pan, but it gains in thickness to the north, where the pebbles lie exposed on the surface. This gravel has yielded many hand-axes and some small implements. The materials used are ironstone, shale, quartzite, and diorite, and all, with the exception of the quartzite, show considerable patination. Some of the hand-axes are polished on one side, which would seem to point to their having lain at some period long exposed to wind

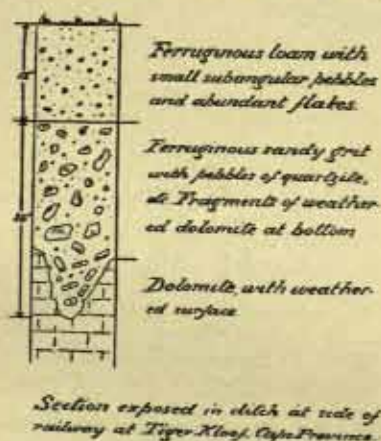


FIG. 12.—SECTION AT TIGER KLOOF.



FIG. 13.—HAND-AXE.  $\times \frac{1}{2}$ .

and sand. Associated with the hand-axes are rude scraping implements and numerous flakes of the cherty rock already referred to. None of the implements appears to have been rolled, the want of sharpness being I believe due to weathering, and I see no reason to question the contemporaneity of the hand-axes and the flakes.

The finest implement of the Tiger Kloof series is the pointed hand-axe (Fig. 13). It is apparently of diorite, with bold irregular flaking and rough retouch, and has a sharp though rather uneven edge. It has a heavy ochreous patination, but is apparently unwaterworn. Slight natural flaking-off has evidently taken place in the dotted areas. Length, 4.7 inches; thickness, 1.2 inches. It is rather more symmetrical than most of the same series, and the fashioning of the butt, though crude, is distinctly good. Fig. 14 represents two other smaller hand-axes of the more usual type. They are both of ferruginous shale, very roughly chipped to an edge all round, and are a striking contrast to the more highly-finished implements



of the Taungs assemblage. With all the Tiger Kloof implements, while some degree of symmetry is evidently aimed at, it is only attained by accident, and what little retouching they have had is very crude. The small quartzite implement (Fig. 15) (of a not unusual type in early deposits in Europe) shows evidence of some careful working on the upper face, but the under face is an untrimmed flake surface with a slight twist. Length, 2.7 inches.

The discoidal scraper (Fig. 16) is well finished for so manifestly early an implement, and I was rather surprised to find it in association with such roughly-made hand-axes. It is of impure chert, and has been trimmed at the edge on both sides, except at the butt. It is the only chert implement I have found in the Tiger Kloof gravel.

A number of flakes were found in the same bed, some of which are shown in Fig. 17. They have had very little secondary trimming, and call for little remark except that they form a part of the assemblage.

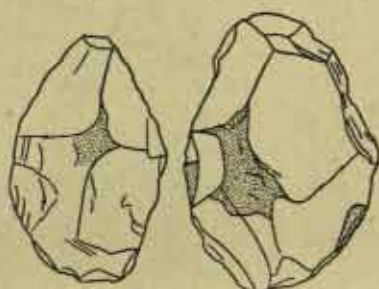


Fig. 14.—Hand-axes of crude workmanship.  
Type 1749

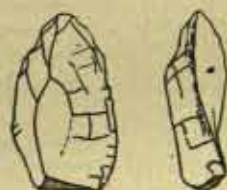


Fig. 15.—Hand-axes of primitive form.  
Type 1750, a trimmed flake  
implement

FIG. 14.—HAND-AXES OF SHALE.  $\times \frac{1}{2}$ .

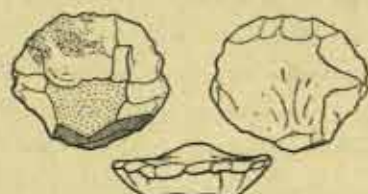
FIG. 15.—QUARTZITE IMPLEMENT.  $\times \frac{1}{2}$ .

There can be little doubt that at Tiger Kloof we are dealing with a culture older than that of Taungs. Apart from the geological evidence, the *cruder workmanship* of the implements is sufficient to establish this point. While the Taungs implements belong to Péringuey's "Orange River Type," those from Tiger Kloof are characteristically of "Stellenbosch Type." The crudity of the latter is in strong contrast to the high finish of the former. The men who manufactured the hand-axes of Tiger Kloof not only did not understand the fabrication of stone tools as did their successors, but they did not know so well how to select their materials.

Evidence of a later culture at Tiger Kloof is abundantly afforded by the top stratum shown in the section (Fig. 12). Lying on the surface all over the area occupied by the institution are numerous small chips of black chert. In the sections where this top loam is exposed, small, well-finished implements, mostly scrapers of various types, can be collected, and from comparison with known examples made by the early Bushman, I have no hesitation in ascribing them to that race. In addition to these small scrapers I also obtained a stone pestle and a *!kwe*, or weight

for the Bushman digging stick, which latter has the additional interest of having evidently been used to grind points to small bone implements.

It should be noted that the later surface implements lack the finish of those found beneath the surface, though they do not essentially differ from them in design. This is in line with our continual experience in South Africa that the handiwork of the modern Bushman shows considerable decadence. The occurrence of both early and late Bushman implements at Tiger Kloof is of interest, and the spot was evidently occupied by these people until very recently, doubtless on account of its excellent water supply and the former abundance of game in the vicinity.



*Fig. 16. Dorsal scraper Tiger Kloof.*

FIG. 16.—SCRAPER OF CHERT.  $\times \frac{1}{2}$ .



*Fig. 17. Flakes with little or no marginal retouch Tiger Kloof.*

FIG. 17.—FLAKES.  $\times \frac{1}{2}$ .



*Fig. 18. Bushman scrapers of various types Tiger Kloof.*

FIG. 18.—BUSHMAN SCRAPERS.  $\times \frac{1}{2}$ .

A series of these small scrapers of various forms, obtained from the loam, is shown in Fig. 18. All have a plain flake surface on the underside, and all are of chert. They show a greater degree of skill than do the later Bushman implements, many of which are nothing more than untrimmed chips.

Even though, as I have already noted, the loam containing these small implements rests upon what I believe to be a very old gravel, bearing palæoliths of early date, it cannot be imagined that the later cultural period directly replaced the former, from which it is so markedly distinct. I believe that at Taungs—by means of the 1st, 2nd and 3rd cultural periods which I have suggested may be traced there—the gap between the gravel and the top loam at Tiger Kloof may be filled.



The following tabulation will serve to make the position, as I understand it, clear. I shall perhaps be considered greatly daring in adding a column suggesting the probable European equivalent, but surely the character of the implements found and their obvious historical sequence allow of tentative suggestion, and I intend no more than this.

I do not mean to suggest that there is any evidence of contemporaneity between the palæarctic and South African areas, which evidence we are hardly likely ever to get, but merely that the succession of culture follows the same historical development in both, and thus far I think we are justified in going, even at the present early stage of our knowledge of prehistoric man in South Africa.

*Table correlating the Deposits of Taungs and Tiger Kloof.*

| — | Summary of Finds.   | Locality.               | European Parallel.   |
|---|---|-------------------------|----------------------|
| 6 | Later Bushman implements of crude workmanship, found on surface                         | Taungs and Tiger Kloof. | Le Moustier.         |
| 5 | Earlier Bushman implements from subsoil   | Tiger Kloof.            |                      |
| 4 | Later well-worked flake implements from top 6 inches of pebble bed, merging into        | Taungs.                 |                      |
| 3 | Earlier flake implements found throughout pebble bed. Possibly some hand-axes           | Taungs.                 | St. Acheul.          |
| 2 | Hand-axes, scrapers and probably some flakes, from pebble bed.<br>"Orange River Type."  | Taungs.                 |                      |
| 1 | Cruder hand-axes, scrapers and flakes from high terrace gravel.<br>"Stellenbosch Type." | Tiger Kloof.            | Chelles and earlier. |

# SURVEY OF THE VILLAGE AND CARVED ROCKS OF ORONGO, EASTER ISLAND, BY THE MANA EXPEDITION.<sup>1</sup>

[WITH PLATES III—XVII, AND MAPS.]

By MRS. SCORESBY ROUTLEDGE.

## INTRODUCTORY NOTE.

DURING the first portion of the time spent by the Expedition on the Island, 1914–15, they resided at the foot of the hill on which Orongo stands, and for some weeks, whenever the weather and other circumstances rendered it possible, ascended to the site and spent the day in examining the remains. They were frequently accompanied by natives with the object of gaining local information, but the knowledge acquired in this way with regard to structure, as distinct from folk-lore, was not very great. Various visits were also paid to the locality by the Expedition towards the end of their sojourn, and doubtful points were studied afresh.

Every possible house was thus in turn entered and many of them more than once. This was not always an easy process, as it usually necessitated scrambling on hands and knees, or wriggling like a serpent, through the diminutive tunnel-like entrances which give access to the interior; the investigation was attended also by a certain apprehension that the large slabs of the roof, often in a precarious condition, might descend on the heads of the visitors. In perfect specimens the inside was almost dark and had to be examined by means of candles. It must be remembered, in extenuation of a certain lack of uniformity which at times exists in the notes, that knowledge with regard to the dwellings was only procured by degrees and as the study proceeded. Some of the work also had to be done during the absence in Chile of the head of the Expedition, owing to the outbreak of the European War.

The survey of the village was made independently by the Surveyor to the Expedition. With regard to each individual house, only a general accuracy of ground plan was aimed at by him, and when the detailed drawing has obviously conflicted with fuller information obtained by others it has been altered accordingly.

In the illustrations, the photographs are topographically accurate. The sketches have been drawn so as to convey a generally truthful impression, but not so as to be necessarily correct in every detail, which was not their object. Some of the illustrations which have previously appeared are repeated for more detailed reference.

The carved rocks were studied on many occasions and in various lights, and photographs were taken. Attempts which were made to obtain paper squeezes were not very successful, as owing to the distance from camp it was rarely found

<sup>1</sup> The cost of the blocks for the illustration of this paper was defrayed by Mrs. Routledge.



possible to remove them at the right moment, the high eddying wind from the cliff tearing them to pieces as they dried.

While every endeavour has been made to ensure accuracy, it will be readily understood that it has been almost impossible to avoid all mistakes and omissions, especially when matters cannot be fully written up on the spot. These it is to be hoped will be rectified by our successors.

Finally, an appeal must be made for kind indulgence owing to the circumstances under which the text has inevitably been finished, which render it impossible to obtain friendly criticism or make personal correction of the proofs.

S.S. Camito, off Jamaica,  
Christmas Day, 1920.

### HISTORY. POSITION, AND PLAN OF THE VILLAGE.

On the summit of the extinct volcano known as Rano Kao, which forms the south-western angle of Easter Island, stand the old stone village and carved rocks of Orongo. There is as yet no clue to the date of the earliest houses or carvings, but the dwellings were occupied as lately as the sixties of last century, and the builder of one of the latest is said to have been remembered in recent times. The site was connected with a bird-cult practised in the islands, and the inhabitants awaited here the coming of a migratory sea bird, the Sooty Tern, which nested on some rocky islets near at hand. Such information as could be gathered about the bird-cult has been recorded elsewhere,<sup>1</sup> and it is proposed to deal here only with the existing stone remains.

On three of its aspects the mountain of Rano Kao has been worn away by the sea till its sides are almost vertical, and, in its outermost portion, only a narrow edge of rock separates the lake, which lies within the crater basin, from the Pacific Ocean. The village commences where the width of the rim, between the crater wall and the sea cliff, is about one hundred yards. It follows the diminishing summit for about two hundred yards and terminates very shortly before the narrowest part of the rim is reached, and where the breadth of level ground is only 30 to 40 feet (Plate III).

Where the houses begin the crater edge is somewhat higher than that of the cliff, and the dwellings lie, broadly speaking, in two rows which at one point overlap one another. The final houses are built amongst a group of rocks which are highly carved. All the houses face the sea, and are entered from that side. For the sake of convenience, the front, or seaward aspect, will be uniformly termed the "south" side; actually it varies somewhat, but is most generally south-west. The total number of dwellings is forty-eight.<sup>2</sup>

<sup>1</sup> See *Folk Lore*, December, 1917: *The Mystery of Easter Island*, p. 258.

<sup>2</sup> The numbers shown on plan reach forty-five, but in three cases, where a house has not been identified by the Surveyor, it has been inserted and the numbers duplicated.

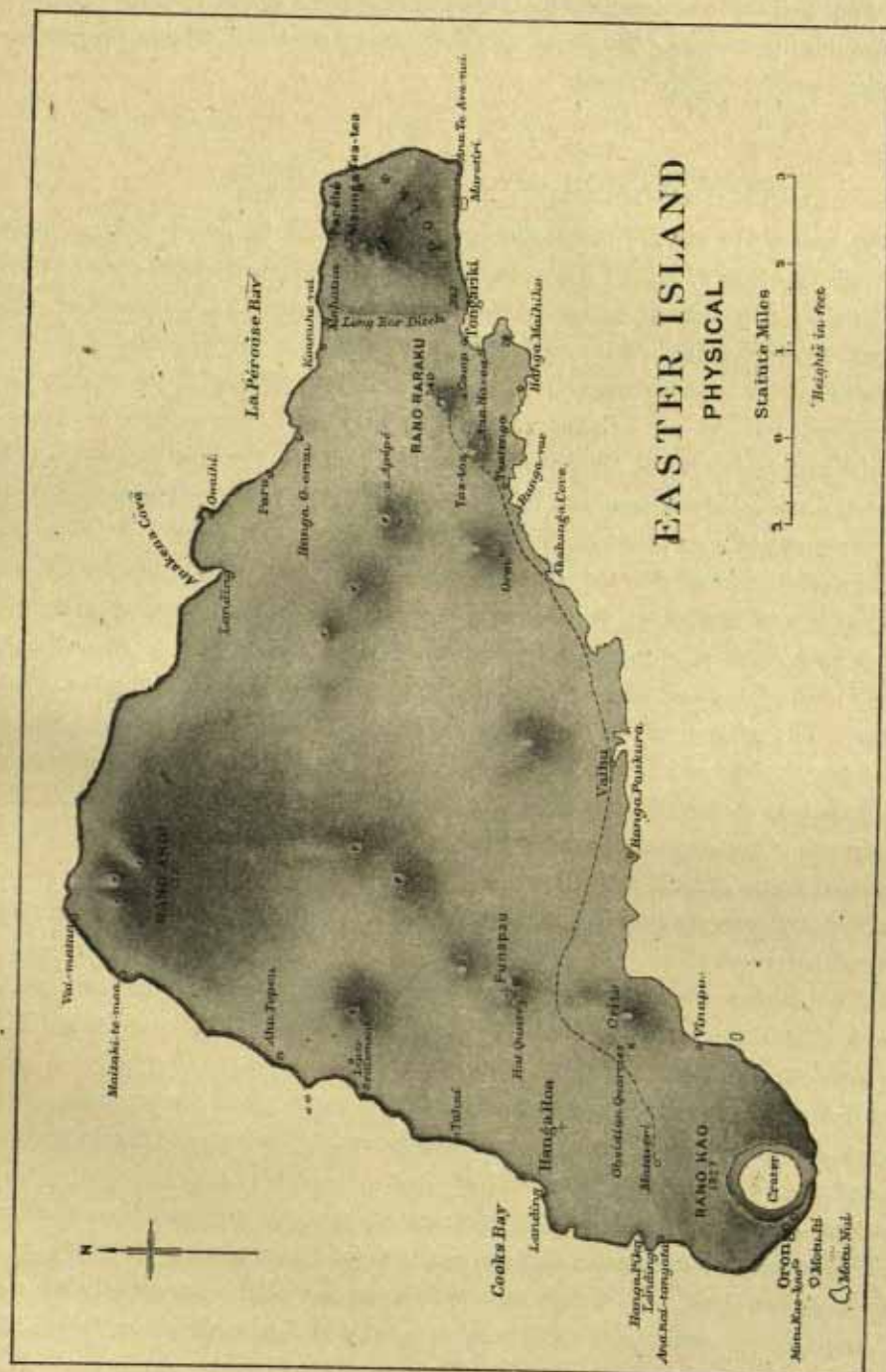


FIG. 1.



Many of the houses are in good repair, in other cases they have been ruined to obtain the painted slabs and carved doorposts, and have no doubt in some instances suffered from natural decay. The rocks are much weathered, but a large proportion of the designs can be clearly traced.

### CONSTRUCTION OF A TYPICAL HOUSE.

All the houses are built of stone obtained from a quarry which is close at hand on the crater side of the summit. The rock is a fine grained volcanic sandstone bedded in large laminae. In certain parts of the quarry the laminae are curved and the section then resembles that of an onion (Plate V, Fig. 1). In size and shape the dwellings differ greatly from one another, accommodating themselves to the formation of the ground and pre-existing structures; they have, however, in common, not only the material of which they are constructed, but also a typical form to which the better specimens approximate in greater or less degree. Such a typical building will be first described, and later each house will be dealt with in detail. The Orongo house differs widely from that usually found elsewhere in the island. In both cases the dominant note is that of the upturned canoe, but, on the lower ground, the "ribs and keel" are of wooden rods, and the "skin" is of thatch, stone being employed for the foundations, or "gunwale," alone, and that only in the best built specimens.<sup>1</sup> Though, as will be seen, there is evidence to show that at least one of these thatched buildings has antedated at Orongo some of the stone dwellings, it is obvious that as a class it is unsuited for so windy and exposed a position. The natives term the Orongo habitation not *haré* or houses, but *ana* or cave.

A typical house is built as follows :—

*The Site* is chosen on sloping ground and the soil excavated sufficiently to obtain the required level space.

*The Foundations* are of rough cubes of rock weighing perhaps one cwt. each. They are laid in the form of an oval, the greatest length of which may be 26 feet, and the greatest width 6 feet (Fig. 3, in text).

*The Walls*.—On the inner side of the foundation course, slabs are set up on edge, the largest and flattest sections of stone from the quarry being used for lining the interior and placed vertically (Plate IV, Fig. 2).

The two side edges of the slabs approximate to the side edges of the adjoining slabs. The panels are of greatest height and size in the centre of the house, and diminish on either hand. In theory, the whole interior of the house is lined with slabs; in practice, towards the extreme ends of the house they are frequently altogether wanting.

<sup>1</sup> See *The Mystery of Easter Island*, p. 215. There are, however, scattered throughout the island numerous cairns with chambers which have been used as dwellings, and in one or two instances more carefully built stone houses.





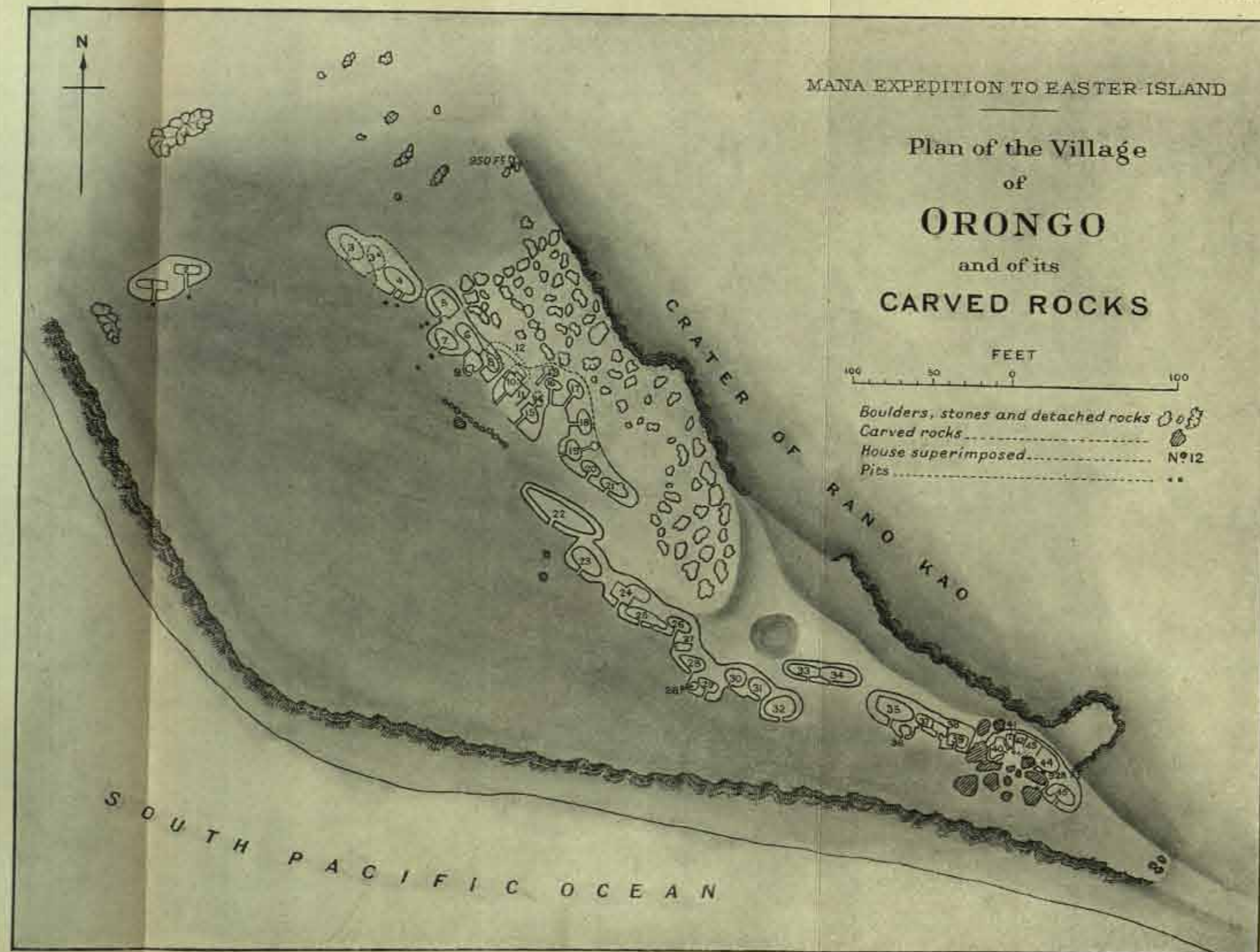


FIG. 2.

SURVEY OF VILLAGE AND CARVED ROCKS OF ORONGO.

[To face p. 420.]

The body of the wall is formed of small or shattered fragments of the stone, laid in horizontal courses with broken joints. These small, horizontally placed slabs are governed in position by the vertical slabs, behind and between and above

MANA EXPEDITION TO EASTER ISLAND

Plan and Sections  
of a  
TYPICAL STONE HOUSE N°22

at  
ORONGO

Surveyed by Lieut. D. H. Ritchie R.N.

FEET  
0 1 2 3 4 5

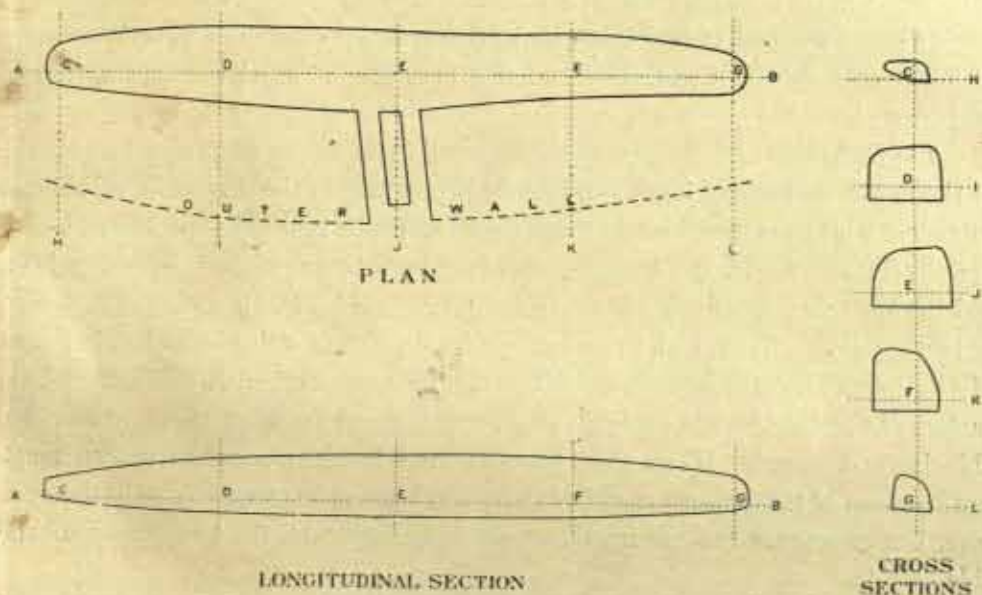


FIG. 3.

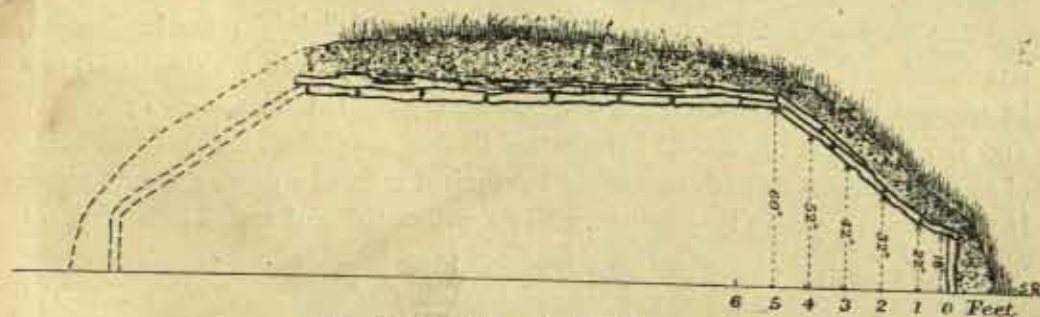


FIG. 4.—VERTICAL SECTION OF A HOUSE.

which they are built up. In portions of the wall where there is no panel—that is, above and between the vertical slabs—the laminæ are brought forward to such a degree that the edges, which are directed towards the interior of the house, are in the



same plane as the panels, thus holding them in place. The result is that the finished wall presents a series of panels of irregular margin with the space behind, above, and between them filled in with dry masonry (Plate X, Fig. 1).<sup>1</sup>

When the back wall—viz., that on the side where the ground is highest—has risen to a certain point, it is panelled on the exterior side also by means of large wedge-shaped slabs of inferior shape and quality, thicker at one end than at the other (Plate IV, Fig. 1). These exterior slabs are held in place by the excavated earth being filled up again behind them. The front wall—viz., that facing the sea—does not have exterior vertical slabs.

The walls are of great thickness; where they can be measured—i.e., on the front side—their width is usually 6 feet or 7 feet.

It is not unusual to find intervals in the masonry carefully arranged to act as niches or shelves, and sometimes as a hatch between two adjoining houses, through which articles could be passed.

*The Entrance.*—At the level of the floor and in the centre of the front or sea side of the house, a means of ingress and egress is provided in the shape of a rectangular tunnel, of which the roof, two sides and floor are, in the best-built specimens, formed of slabs (Plate VI, Fig. 2). At either end of the tunnel—i.e., where it enters the house and the open air respectively—is a door frame (Plate XI, Fig. 1). The frame consists of two uprights, a lintel, and, in perfect specimens, also of a sill. The last is formed of a slab sunk vertically into the ground, so that its upper edge shall be flush with the surface of the floor.<sup>2</sup> The uprights at the exterior end are often stones of considerable size, and carved. Where these frames remain in place, accurate measurements can be given of the passage at either end. Each house has typically only one aperture, but sometimes two are found, or one is in duplicate, the two passages being side by side.

*The Floor* is raised slightly above the level of the foundations. Selected earth is used; it is never paved with stone.

*The Roof.*—When the walls have reached their full height the laminæ are imbricated, or “tumble home,” till the opening is reduced to such a size that it can be spanned by a series of single slabs, thus completing the arch or roof (Plate V, Fig. 2). For these roofing slabs the curved laminæ are chosen, and they are often of such dimensions that ten men would be required to move a single slab into place. If the house is seen in longitudinal vertical section the roof resembles a dome, of which, say, the middle two-fourths is flattened (Fig. 4, in text).

The height of the chamber measured from the highest part of the roof to the floor is usually about 5 feet.

<sup>1</sup> This method is practically identical with that employed in building the seaward face of many of the *ahu* or burial places. See *The Mystery of Easter Island* (Fig. 37).

<sup>2</sup> In the following descriptions there is frequently no mention of the sill, but it is believed that where there is no note on the subject it did not exist, or was not visible.



*Form of Structure.*—The shape of the house, when the roof is added, noticeably resembles that of an inverted Canadian canoe, i.e., both ends are alike, and as it diminishes in breadth, so does it diminish in height.

*Earth Covering.*—When the house is completed soil is placed over it; the depth of the roof may amount to about 2 feet. The anterior wall alone is left bare. Otherwise the house is so covered with earth as to blend with the surrounding surface (Plate VIII, Fig. 1).

*Decoration.*—The interior is often decorated by means of a white pigment, with which the walls and roof are covered, giving the effect of whitewash. The largest slabs—i.e., those opposite the doorway, where they obtain most light—are frequently also adorned with designs in colour (Plate IV, Fig. 2).

*Exterior Cavity for Stores.*—Outside the house a small pit is not unusually found, a few feet from the door and in line with it. These pits are lined, and in the best specimen, also floored and roofed, with slabs. Nodules of volcanic ash were frequently found in them, which are said to have been used for heating purposes, and the pits were at first reported to have been used for cooking purposes. Later it was stated that they were intended to contain stores, and as practically no charred ash was found, this latter statement is probably correct (Plate VII, Figs. 1, 3). These pits are shown in the plan where discovered, but many are probably buried or destroyed.<sup>1</sup>

*Kitchens.*—The site of the cooking places was pointed out nearer the cliff edge. They were, it was said, simply cavities dug in the earth and not lined with masonry.

## THE HOUSES IN NUMERICAL SEQUENCE.

Nos. 1 and 2 are covered by the same mound of earth. Their orientation is unique, as they stand at right angles to the crater, and also at right angles to the main row of buildings.

### No. 1.

Condition:—one-third of house at the north-west end broken down. Roof and part of wall absent. Panels<sup>2</sup> largely broken away.

Passage:—6' 8", outer end indeterminate, inner end 1' 6" × 2' 1"; roof of flat slabs; has apparently never had panels.

Chamber:—23' 0" × 4' 4" × 4' 3". East end square, made from slab 3' 6" wide; west end rounded.

Decoration:—exterior, a large sculptured stone, contiguous to outer door but partially buried, was laid bare. It bore one small bird-man<sup>3</sup> figure and a larger design obliterated by weathering.

<sup>1</sup> The "drain for the dead," mentioned by Surgeon Palmer (*Ethnological Review*, Vol. I, p. 371), was carefully sought and excavated for, but could not be recognized.

<sup>2</sup> In the following description, for the sake of simplicity the laminae will be termed "panels" where employed vertically, and "slabs" when used horizontally.

<sup>3</sup> See below, "Carvings according to Type," *Bird-man*.



Small Pit :—immediately in front of door (excavated) defective, lower portion of stone apparently circular, diam. about 2' 0"; contained shells of sea snails, no trace of fire.

No. 2. (Plate VI, Fig. 1.)

Condition :—unroofed.

Passage :—outer end fallen in, inner end 1' 2"  $\times$  2' 1".

Chamber :—23' 0"  $\times$  5' 8"; both ends bluntly rounded, radius east end 23", west end 32"; most of roof fallen on to floor; panels largely removed.

Decoration :—none.

Small Pit :—5' 0" from approximate position of former door, contained small chunks of volcanic ash.

Nos. 3, 3A and 4 are built individually and covered by a common mound of earth. They commence the line of houses with their backs to the crater.

No. 3 is completely wrecked, but excavation made clear that it has been a distinct house from the one next to it, No. 3A.<sup>1</sup>

No. 3A.

Condition :—roof partially fallen in at one extremity. Outside door had to be searched for and cleared.

Passage :—6' 7", outer end indeterminate  $\times$  1' 5", inner end 1' 6"  $\times$  2' 0".

Chamber :—23' 0"  $\times$  5' 7"  $\times$  4' 7".

Decoration :—traces of interior covering of white pigment. On slab facing door a painting in red on white ground of a full rigged ship with her yards in line with her keel, two square sails on each mast.

Objects found :—On floor, large number of marine shells, remains of chicken and rabbit bones, one rabbit bone with traces of red paint—a bone needle.

No. 4.

Condition :—almost perfect

Passages :—two; eastern passage 7' 9", outer end (partially filled up) 1' 9"  $\times$  1' 5"; inner end 1' 10"  $\times$  1' 11"; western passage 7' 0", outer end 2' 6"  $\times$  2' 9", no sill. The walls consist in their lower part of large bars of stone having a smooth surface; in their upper part of small slabs with their free edges accurately adjusted

Chamber :—23' 5"  $\times$  5' 9"  $\times$  5' 0"; radius east end 3' 3", west end 2' 10". The largest of the panels is 3' 10"  $\times$  2' 10", from this they range down as required. The walls "tumble home," leaving an interval of 2' 6", which space is covered by flat slabs. The central 12 feet of the roof is almost flat, the slabs being placed edge to edge.

Decoration :—whole of interior surface of walls and roof has been covered with white pigment.

<sup>1</sup> Nos. 2 and 3 are presumably those wrecked by the American Expedition in 1886, but it is not possible to make the plan of Orongo made by the *Mohican* coincide entirely with our own. The account of Paymaster Thomson is as follows :—

"From houses Nos. 2, 3 and 4 (Fig. 6) on Lieut. Symonds' chart of Orongo, were taken samples of these sculptures (*i.e.*, carved door-posts). . . . Houses marked 1, 5, 6, were demolished at the expense of great labour, and the frescoed slabs obtained."—*Smithsonian Report*, 1889, p. 480.

The photographs of Orongo in the Report are excellent.

Objects found:—one of the sea boulders which are used as pillow stones (Plate XVI, Fig. 3) and two *mataa* (spear-heads).

Small Pits:—two. One is 3' 0" from east door, 2' 0"  $\times$  2' 0"; the other (excavated) is 5' 0" from west door, 2' 0"  $\times$  1' 5"  $\times$  1' 3" deep; it is formed of slabs placed vertically, no defined bottom. No signs of fire save one piece of charcoal.

Nos. 5, 6, 7, 8 and 9 form a group; 6 and 8 are divided by a partition wall only; 7 and 9 have been subsequently added. 9 is remarkable from the circular shape, which has been found the best way of utilizing the available space. 5, 6 and 7 have all been decorated with designs of European ships.

In the rocks above this group at its westward end is a cave which has been inhabited.

No. 5.

Condition:—fair.

Passage:—5' 0", outer end indeterminate  $\times$  1' 5"; inner end 1' 10"  $\times$  1' 7", with sill. Walls of small slabs with free edges corresponding.

Chamber:—23' 5"  $\times$  6' 4"  $\times$  5' 0". Front wall is somewhat irregular, forming club-shaped extremities. East end has rectangular corners and is 5' 4" wide. West end has also corners almost rectangular, and is 7' 2" wide.

Decoration:—does not appear to have been "whitewashed" generally, but two of largest panels, those opposite the door, have had painted designs, one showing indication of a square-rigged ship, red on white ground, as in House No. 3A.

Small Pits:—two; one 6' 0" from door, 1' 10"  $\times$  1' 10"; the other 9' 10" from door in approximately same line, 1' 5"  $\times$  2' 1".

Natural Cave, used as dwelling place, above No. 5. The excavation disclosed the foundation of a wall which closed the mouth of the cave, allowing entrance through a doorway. The inside area was excavated to a depth of 1 foot. A well-finished *mataa* was found, also a quantity of flakes and chips and a hammer-stone.

Outside the wall, and immediately contiguous to it on the right of the entrance, was a small pit, containing sheep bones and shells and the rounded nodules of ash used for heating—no charcoal.

No. 6.

Condition:—almost perfect.

Passage:—6' 2"  $\times$  2' 10", outer end 1' 6"  $\times$  1' 2", inner end not stated, no sill.

Chamber:—21' 4"  $\times$  5' 10"  $\times$  4' 9". East end is only divided by a rough partition from No. 8. On west side of entrance, 4' 0" from door, a cavity has been left between the upper portions of two large panels, making a V-shaped opening which has been formed into a properly made hatch leading into No. 7.

Decoration:—two large panels opposite doorway with painted designs. A, a face adorned with paint, red on white ground; B, three-masted ship, black on white ground, with two small figures in rigging, one of them wearing a red shirt (Plate IV, Fig. 2, II). Roof painted white.



## No. 7. (Plate VII, Fig. 1.)

Condition :—Front of house has fallen down through door-posts being removed : entrance passage blocked by débris. A small opening was made in the west end of roof by which to enter.

Passage :—outer end broken down and excavated, inner end  $1' 8'' \times 1' 9''$ , lower portion of frame *in situ* ; floored with slabs in and near entrance.

Chamber :— $18' 10'' \times 6' 5'' \times 4' 2''$ . Connecting hatch to No. 6, *q.v.* A small pit was found in the floor near the door, the only instance discovered of such a pit within a building ; two sides remained, length  $2' 1''$  ; contained two sea boulders, bird bones and shells ; no sign of fire.

Decorations :—outside : a sculptured stone, partially buried, in exterior wall about  $3' 0''$  from doorway, which was excavated and found to bear a roughly carved face, the eyes slanting from the nose upwards ; the ear is indeterminate but approaches the natural rather than the elongated type (Plate VII, Fig. 2). Inside : roof whitewashed in places : panel facing door has indications of square-rigged ship, black on white ground.

Objects found :—three pillow stones.

Small Pits :—one in chamber (as above). Two outside the house in line with the door and with one another. The first  $1' 4''$  from door,  $1' 6'' \times 1' 4''$ , small boulder inside. The second  $4' 0''$  from door, oval,  $3' 0'' \times 2' 0''$ , made of pieces of laminated rock placed on edge in the middle and on side at end : floored in major portion with two large slabs and elsewhere in part with small pieces ; the roof not perfect but formed of slabs, imbricated like the houses, and apparently closed by one slab. Depth from roof to floor has been about  $7''$ . It contained *pipi* (shells) and chicken bones, and at the edge rounded stones such as are used in heating. No trace of fire.

## No. 8.

Condition :—good.

Passage :— $6' 3''$ , outer end  $1' 7'' \times 1' 4''$ , inner end  $1' 8'' \times 1' 8''$ , with sill ; carefully paved.

Chamber :— $14' 10'' \times 5' 4'' \times 4' 9''$ . East end radius  $1' 11''$ , west end blunt and only slightly curved, its terminal wall  $3' 1''$  in width. The partition wall dividing from No. 6 is not uniformly solid, and would permit of the passage of articles, but not of persons. The dome of the roof consists, as to its middle three-fifths, of slabs laid side by side.

Decoration :—white paint on some slabs of roof.

## No. 9

Condition :—good, but protecting earth from one side and dome of roof washed away. Exterior walls raised on natural boulders.

Passage :— $1' 2''$  only, outer end  $1' 11'' \times 1' 4\frac{1}{2}''$ , inner end  $1' 3'' \times 1' 6''$ , no sill ; paved with one slab.

Chamber :—almost circular  $6' 9'' \times 6' 4''$ . Walls formed of large panels extending  $2' 0''$  above the floor line ; the roof rests on the panels and is gradually domed inwards, its summit is formed by one large slab closing a terminal opening of  $3' 0''$  in width.

Decoration :—none.

The group comprising houses Nos. 10 to 16 (Text-fig. 5; Plate VIII, Fig. 1), forms the most interesting and also the most difficult problem in the village. The following explanation for the position of three houses is put forward, with reserve on certain points.

Nos. 13 and 16 are the earliest houses of the group, forming part of the original line of the village. No. 14 was obviously built to accommodate itself to them, and

"MANA" EXPEDITION TO EASTER ISLAND

Plan of  
GROUP OF STONE HOUSES  
at  
**ORONGO**

Surveyed by Lieut. D. R. Ritchie R. N.

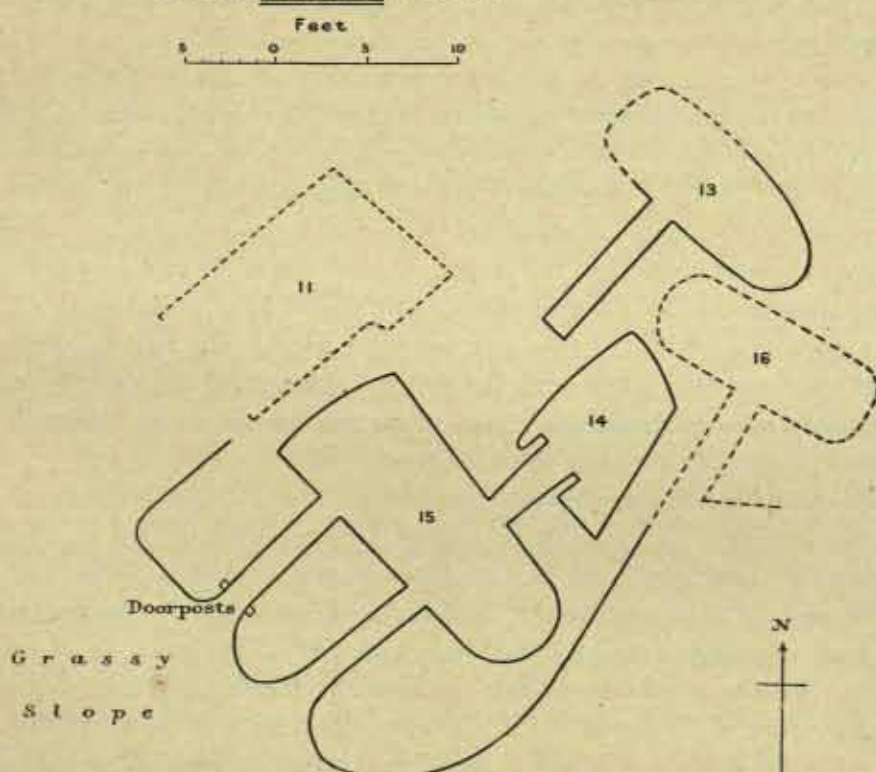


FIG. 5.

it may reasonably be concluded that it originally communicated direct with the outer air, otherwise the length of its passage would be pointless.

No. 13 has been wrecked by a fall of stones from above and never repaired. No. 15 was subsequently built in front of the now useless entrance of No. 13, and also in front of No. 14, turning the latter into an inner chamber? (Text-fig. 5).

The end wall by this later addition, No. 15, also made Nos. 16, 17 and 18 open on to a small court.



Nos. 10 and 11 are only separated from one another by a partition, and were therefore presumably built at the same time. The east end of No. 11 has the appearance, as far as it was surveyed, of having been built to accommodate itself to the west end of No. 15; if this is the fact Nos. 10 and 11 are later than No. 15. No. 11 is the house which contained the statue now at the British Museum (HOA-HAKA-NANAIA) and is unique in shape. Either the house was built to contain the image, or this is the original position of the statue and the house was erected later; in view of the irregular form of the building, the latter seems the more probable.

Not only is No. 11 presumably more recent than No. 15 and consequently than No. 16, but there is evidence of a different and interesting character to connect it chronologically with the later numbers 17 and 18. It contains, in common with the last two houses, stones wrought in the manner typical of the foundation stones of the thatched type of dwelling. Not only is their shape remarkable, but most of these stones possess also cup-shaped depressions in which were inserted the rods which were tied together at the top to support the thatch, and are quite unmistakable. Inside No. 11 is a small stone of this nature, while two large ones wrought to type have apparently been its door-posts (Plate VIII, Fig. 2). Nos. 17 and 18 have no less than eight such stones built into their walls, including two of the curved shape which form the ends of the thatched houses. A structure of the type now associated with the lower ground has therefore presumably existed in this neighbourhood, and been at some time destroyed, the material being used in the new buildings. A wrought stone of similar origin forms the west end of No. 22, which is near by, other wise the only other places in the village where such stones are to be found are, curiously enough, in Nos. 43 and 44 at its extreme end.

Not less interesting than the old foundation stones is a circular stone, also of hard basalt, which is built into No. 18, and precisely resembles the bed plates of the images on the *ahu* (Plate X, Fig. 2). Its measurements are 3 feet 5 inches by 2 feet 10 inches, those of the base of the statue, 3 feet by 1 foot 6 inches. The probability seems great that the statue originally stood on it, in the open, in the same manner as the other statues in the island. The only difficulty lies in the contracted form of the base of the image which is not associated with the *ahu*, but with the buried statues. The image is said to have been, before its removal, embedded in the ground, which presumably accounts for the excavated condition in which we found the floor of No. 11. It seems not unlikely, however, that the figure would in any case be sunk when placed in or surrounded by the house, in order to lessen the necessary height of the building.

If the statue was in place before any of the houses were erected it would account for No. 13 being built so far back and out of the line of its neighbours, a position which proved its ruin.

No. 12 seems to have been erected last of all, and when sites were still more difficult to obtain. It is on a higher level than Nos. 8 and 10. Its foundation



wall rests on their back walls and is approached between their respective covering mounds.

A regular line of small boulders which runs in front of houses Nos. 9 to 15 has the appearance of part of a foundation, but no satisfactory explanation was forthcoming and none could be found.

No. 10.

Condition :—good.

Passage :—7' 9", outer end had to be partially excavated, width 1' 5", inner end 1' 10"  $\times$  1' 10".

Chamber :—length 14' 6". The east end is the widest portion ; it is formed by a straight wall 8' 5" in length ; about the middle of the chamber—i.e., at 7' 0" from the east wall—the width is 8' 0" ; at 10' 0" from the east wall it is 6' 5" and at 11' 0" it is 4' 3". The two end walls and the two side walls curve inwards, and great slabs are placed on the top ; the result is a completely vaulted chamber. The greatest height is 5' 1".

Parallel to the north wall, and on the further side of it, is a long cupboard 5' 6"  $\times$  2' 11"  $\times$  2' 3". It is reached from the chamber by an aperture through the wall, with a width of 1' 0" at the bottom, 5" at the top, and a height of 1' 4".

Decoration :—none.

No. 11. (Plate X, Fig. 1.)

No. 11 presents a form entirely different from that of any other house. It is a chamber with vertical walls and an almost flat roof. It has one square end, that at the north-west corner, and a rectangular recess at the north-east corner. One end of the roof and one end of the building, those on the south aspect, are entirely missing. The walls are laid bare some six to nine inches below the foundations.

The east side is formed as to its southern part by a straight wall, as to its northern part by a recess. The foundation consists of three blocks of stone, one of which blocks is hand-wrought. The floor has been excavated to the extent of 9" below the lower border of the blocks. On these three foundation blocks the wall is built by placing slabs horizontally. These laminae gradually extend inwards at the top of the wall so as to form the lower portion of the roof, which is finally completed by the super-position of large slabs measuring respectively in the clear inside 3' 5"  $\times$  3' 2", 3' 1"  $\times$  1' 3", and 3' 0"  $\times$  1' 2". The height of the east wall from the assumed old floor line to the spring of the arched roof is 3' 9". The length is 8' 5".

The recess commences at 8' 5" from the south end of the east wall and extends from that point to the north wall of the building. This recess is a continuation of east side of the house and is 4' 10" in length. It is 1' 0" in depth.

The south side of the recess is formed by the end of the slabs of the east wall being gradually brought inwards to form half an arch. In the north side of the recess (coinciding with the eastern end of the north wall of the house), the lower 22" are panelled, above which slabs gradually project inwards, thereby forming the corresponding half of an arch. The east, or back side, of the recess is formed of four panels, one of which panels extends above the floor line 2' 5". Resting on the upper edge of this panel the slabs extend upwards, each slab



projecting inwards, forming a curved surface blending with the roof. The three panels which form the remainder of the east wall of the recess are only slightly built to the lamellar structure. The total result is a recess, or alcove, with a rectangular floor and walls in its lower part, but concave from side to side and concave from above downwards in its upper portion.

The curvature of the east and north walls gradually blends into the flat roof of the building, formed by four flat tiles, imbricated.

*The north side* is a wall which consists in its lower part of three panels, two of which measure respectively  $2' 5" \times 3' 2"$  and  $4' 0" \times 2' 11"$ ; on these three panels rest the upper part of the wall, which is made of imbricated slabs gradually projecting inwards to form the roof. This north wall is built into a solid bank. Its length is  $8' 8"$ , including the recess at its east end.

*The west side* is a wall which consists in its lower part of five panels, two of which measure respectively  $3' 4" \times 3' 4"$  and  $5' 0" \times 1' 3"$ . These panels simply form an imperfect partition between this and the adjoining house (No. 10), and there is no indication that, at this point, a wall built of slabs ever existed. The panels have been undermined and displaced, but have evidently carried, and do still carry, the upper portion of the wall, which is of slabs and is uncurved. Length  $12' 6"$ .

At the north-west corner is a wrought foundation stone of basalt with a cup-shaped cavity

*The south side* is reported to have been destroyed when the image was taken out. The house is stated to have originally had a passage entrance similar to the other dwellings, but no such foundations are at present visible. Exterior to the present entrance is a cupboard niche which seems to have served the same purpose as the small pits.

Line of embedded stones, carved stone, and two door-posts.

In front of houses Nos. 9 to 15 and some twenty feet from them is a line of boulders inserted in the ground which extends for about fifty feet.

Adjacent to this line of stones, on the sea side, is a horizontal stone on which is carved the figure of a bird-man seated on a head or skull.<sup>1</sup>

Also near the line of stones, but on the crater side, were lying the two large stones wrought as foundations for a thatched house, which have been presumed to be the door-posts of No. 11, thrown aside when the house was destroyed. On one of these a face has been carved (Plate VIII, Fig. 2).

#### No. 12. (Plate VI, Fig. 2.)

The situation of this house is unique. It is built on a higher level than those in front of it, Nos. 8 and 10, and its front walls rest on their roofs.

Condition:—major portion of roof and south wall deficient. Exterior door and passage had to be excavated, only the lower portion remained.

Passage:— $7' 4"$ , outer end width at bottom  $1' 4"$  with sill, inner end width at bottom  $1' 9"$ , no sill; paved with blocks.

Chamber:— $25' 6" \times 5' 2"$ . Central portion unroofed. East end semi-circular; west end rectangular  $3' 0"$  in width, the end wall  $1' 0"$  in height from which springs the domed roof. The lower part of the north wall is formed of irregular

<sup>1</sup> The position of this stone was altered slightly by us in order to photograph it.



cubes with panels in places, slabs superimposed. The lower portion of the south wall is faced with thin panels and slabs superimposed.

No. 13.

Situated immediately against and 10' 0" below a vertical wall of rock.

Condition :—east end perfect. At west end two-thirds of the roof have been crushed in, and the house filled up with rocks and debris from above.

Passage :—none connecting with present exterior, but on south side of house (7' 9" from east end) is an opening with perfect frame 1' 9"  $\times$  2' 2" with sill. The east door-post has two slots cut in it, 1" and 2" respectively; no corresponding slots in west frame. The opening is the entrance to a passage 9' 0" in length and in perfect condition, which is closed at the further end. The walls are formed from floor to roof of slabs; the roof is of slabs placed edge to edge; the floor has no slabs.

Chamber :—13' 0"  $\times$  6' 0"  $\times$  4' 0". East end semi-circular, normal domed roof; west end in ruins.

Decorations :—the edge of one of the slabs in the passage, measuring 2' 0" long by 3" deep, is engraved throughout its entire length with *ko mari*<sup>1</sup> figures and covered with white pigment.

Objects found :—3' 6" from further end of passage a skull lay on its left side silted up to line of the sagittal suture. The earth was not in contact with the buried surface of the skull, being distant from it all round for about half an inch, the tip of the finger could be inserted beneath the skull on the left side. A quantity of bird bones and sea shells were lying in passage.

No. 14. Opening out of No. 15.

Condition :—good.

Passage :—4' 7"; outer end (from No. 15) broken 2' 9"  $\times$  1' 9", inner end 1' 9"  $\times$  1' 5".

Chamber :—a symmetrical recess each side of the inner end of passage. Greatest length of main chamber 7' 6"; greatest width 6' 6" (for details see plan); height 4' 7".

Objects found :—*mataa* in passage.

No. 15.

Condition :—perfect, except exterior entrances, which are broken down.

Passages :—two; west passage 7' 9", outer end broken (excavated), inner end 1' 9"  $\times$  1' 5"; east passage blocked.

Chamber :—17' 9". East end semi-circular, greatest width 6' 0" (radius 2' 0"), west end almost rectangular, width 7' 8". (For details see plan.)

Decoration :—panel opposite west passage, 2' 4"  $\times$  2' 11", with painting of a bird.

No. 16.

Condition :—practically perfect.

Passage :—6' 0", outer end imperfect, inner end 1' 9"  $\times$  1' 7" with sill.

Chamber :—12' 9"  $\times$  5' 0"  $\times$  6' 2". Ends oval and flattened. Walls lined with particularly large panels, the surfaces of two of these, as they show above the floor, measure respectively 5' 0"  $\times$  4' 0" and 4' 0"  $\times$  4' 0". This house and No. 17 are exceptionally high.

<sup>1</sup> See below, "Carvings according to Type," *ko mari*.



## No. 17.

Condition :—Almost perfect.

Passage :—6' 6", outer end imperfect, inner end 1' 8" × 2' 3", with sill.

Chamber :—14' 0" × 5' 7" × 6' 6". Normal type. Ends curved and flattened, End wall vertical, 6' 0" in height. Solid wall separate from No. 16. Built into walls are five wrought stones of the type used for foundation of thatched houses, four of them show drilled holes of customary style and two of them are also curved as used for the ends of the houses, one has no holes. Roof is only slightly domed.

Objects found :—a number of pillow stones.

## No. 18. (Plate X, Fig. 2.)

Condition :—very good.

Exterior wall contains a drilled stone of previous type, also a round stone with flattened surface, measuring 3' 5" × 2' 10".

Passage :—4' 6", outer end imperfect, inner end 1' 5" × 1' 11", with sill; walls of panels, not of slabs.

Chamber :—13' 0" × 5' 7" × 5' 0". One end rounded and much flattened, giving width on floor of 5' 0". Into eastern wall are built two wrought stones, one containing one hole and the other one and a half holes.

Decoration :—one stone highly ornamented, painted, and with seven *ko mari* figures deeply cut.

Objects found :—four *mataa*.

Carved stone built into wall between entrances of No. 18 and No. 19. Design, bird-man.

Nos. 19 to 21 terminate the line of buildings on the higher portion of the ground.

The only dwellings in this section of which the ground plan calls for remark are Nos. 19 and 19A. Here we have two structures, as with Nos. 14 and 15, opening out of each other, not directly, but with a passage between them of considerable length. In this case the interior abode is more of the nature of a cave, being partly excavated out of the rock. That the outer chamber was here also an afterthought seems not improbable. It is possible, however, that it may have been deliberately constructed as a place of hiding, a theory to which the attempt to conceal the entrance would lend some colour.

The concluding houses, Nos. 21 and 21, are falling into decay.

## No. 19.

Condition :—practically perfect.

Passage : 5' 0", outer end broken, inner end 1' 8" × 1' 7½", sill perfect.

Chamber :—14' 0" × 4' 0" × 4' 0". Construction typical throughout. Ends oval. Floor level with sill. A properly built hatch 9" × 9", opens into No. 20.

Decoration :—slabs opposite door have been painted, almost obliterated; on roof, birds red on white, a figure 8" × 4" which may be a *mataa*, and various other designs.

## No. 19A. Cave Annexe to No. 19.

Condition :—half of slabs forming roof have fallen in, large amount of earth worked in from above, floor very wet.

Passage :—8' 0", outer end 1' 8"  $\times$  2' 2", is a concealed entrance behind a slab in No. 19, the inner end opens into the cave.

Chamber (cave) :—circular 6' 0" in diam.  $\times$  5' 0" in height, hollowed out of natural rock and walled up in places. Roof formed of flat slabs.

Decoration :—lintel of door behind slab covered with *ko mari* figures ; opposite door a painting on natural slate, red outlined in white, possibly a canoe under canvas. White patch on ceiling.

No. 20.

Condition :—roof and south side threatening to fall.

Passage :—about 5' 0", outer end missing, inner end 1' 9"  $\times$  indeterminate, no sill or lintel in accurate position.

Chamber :—18' 0"  $\times$  4' 10"  $\times$  5' 6". West end oval, termination 2' 2" in width ; east end flattened, termination 4' 1" in width. Northern wall exclusively composed of large blocks and slabs. Hatch communicating with No. 19 has an opening of 1' 6" and a length (through the wall) of 1' 10", the bottom formed by a single slab. Immediately inside the doorway a cavity has been hollowed under the floor and covered with slabs.

Decoration :—north wall many carved *ko mari* figures. No other design.

No. 21.

Condition :—a quarter of the roof at the east end is gone, entrance blocked, and whole tottering.

Passage :—about 4' 0" remains, outer end gone, inner end 1' 6"  $\times$  1' 7", no sill.

Chamber :—20' 0"  $\times$  5' 6"  $\times$  5' 7". East end oval, on its north side a small alcove 3' 10"  $\times$  2' 1", having a semilunar curved roof and domed back, pillow stone *in situ* ; west end flattened ; a hole through the wall communicates with No. 20.

Objects found :—pillow stone, and sphagnum from crater lake (used for caulking boats).

No. 22 begins the line of houses which stand at slightly lower level than the foregoing, and nearer the sea. They continue in a comparatively straight line till No. 32 is reached. The shape of the houses varies considerably. No. 22 is one of the largest and most typically canoe-shaped in the village. The floor was excavated, but nothing found which would, it was felt, justify similar work in other houses. Nos. 24 and 25 are of irregular form with curious extensions, while No. 27 is oblong, not oval. Near the entrance to No. 22 are some stones carved with a bird-man and a face.

No. 22. (Text-fig. 3.)

Large and typical canoe shape. Condition good.

Passages :—two, nearly identical, each 6' 9", outer ends frames missing and measurement uncertain, inner ends west 1' 8"  $\times$  1' 8", east 1' 10"  $\times$  1' 5" ; both with sills, inner portion of both passages flagged ; in outer portions flags appear to have been removed.

Chamber :—52' 0"  $\times$  5' 9"  $\times$  4' 8". (See Text-fig. 3.) Size of panels somewhat irregular. Cupboard in the wall 5' 0" from west passage entrance, 1' 0"  $\times$  2' 0" and 1' 8" back to front.



Floor was excavated by drawing a line down the centre and very carefully scraping the surface of one-half of it. For a depth of 2" the substance was a bright yellow volcanic ash, homogeneous, which had apparently formed a "piga-leered" floor. The upper surface of this floor was undulating, having apparently sunk locally. At a depth of 1' 0" the same material was found non-homogeneous, and in the shape of rough nodules. Resting on the pigaleered floor and fitted against the panels, but not passing under them, were four small slabs. Charcoal dust, and pieces of charcoal the size of a finger-nail were found in very small quantities 10" beneath the upper surface of these flagstones. Charcoal was also found in one other spot, a depression in the floor, 4" below the surrounding surface, and mixed up with the alluvium which had accumulated in the hollow. With the exception of the foregoing no object suggesting action of man was observed in cutting through the floor, or in clearing the surface of the floor of alluvium.

Decoration:—two panels opposite entrance have been painted

#### No. 23.

Condition:—very good; a small hole in roof.

Passage:—outer end and part of passage blocked, inner end broken; lower half of wall made of panels, upper half of slabs.

Chamber:—21' 8"  $\times$  7' 4", the greatest height is 5' 7", the walls at the east and west ends are respectively 2' 0" and 1' 5" in height. The ends are curved and domed. The whole is particularly well-built.

Decoration:—on the north wall are two slabs with faint traces of a square-rigged ship painted in white on red background.

#### No. 24.

Condition:—the two ends are in fair preservation; the middle portion of the north wall and roof have fallen.

Passage:—ruined, outer end broken, inner end 1' 10"  $\times$  2' 0", with sill.

Chamber:—total length, 19' 6". Shape irregular, the entrance is not in the middle of the chamber but at 5' 6" from the west end, towards the middle of the house the north wall recedes till at about 11' 6" from the west end the greatest width is reached, 14' 3". The height of the wall at the west end is 2' 0", at 4' 0" from the east end the height is 4' 0".

#### No. 25.

Condition:—middle two-fourths of roof of main part of house missing, both entrances blocked.

Passages:—two; west passage (10' 0" from west end of chamber) in ruins, inner end still open but no post, lintel, or sill; east passage (18' 6" from west end of chamber) outer end broken down, inner end 1' 6"  $\times$  1' 6".

Chamber:—length 22' 0", width (4' 0" from west end) 7' 4". Height of dome roof at west end 3' 2". The west end is square 6' 6" in width, and the north wall at this point is formed of a mass of basalt giving a height of 2' 6" above the ground and a width of 5' 0".

At east end of chamber is an extension 7' 0" in length with uniform width of 5' 0"; greatest height 3' 4"; wall at east extremity 1' 9".

Decorations:—none exist.

No. 26. (Plate IV, Fig. 2, and Plate XI, Fig. 1.)

Condition :—perfect.

Passage :—5' 2", outer end 1' 8"  $\times$  1' 9", inner end 2' 3"  $\times$  1' 10", with sill ; paved.

Chamber :—23' 4"  $\times$  6' 6"  $\times$  4' 3". Construction normal. East end oval ; west end flattened.

Decorations :—Panels of wall painted, showing three representations of "ao,"<sup>1</sup> red on white, one bird<sup>2</sup> red on white, one design in black, possibly a ship ; on roof, birds painted in red, black and white.

No. 27.

Condition :—perfect.

Passage :—1' 8" only, outer end 1' 10"  $\times$  1' 8", inner end 1' 9"  $\times$  1' 4", with sill ; paved.

Chamber :—8' 2"  $\times$  4' 3"  $\times$  3' 9" Shape oblong, not oval, north side longer than south side, corners consequently not rectangular. Door at west end, not in centre.

Decorations :—one slab (not opposite door but near it on north side, shortness of passage allowing light) inscribed with design.

No. 28.

Condition :—most of roof and portion of north wall gone.

Passage :—6' 6", outer end broken down, inner end 2' 0"  $\times$  indeterminate ; roof slightly concave.

Chamber :—length 24' 0" ; width at 4' 0" from east end = 5' 3", at 8' 0" = 6' 4", at 16' 0" = 5' 11" ; height indeterminate. East end is a dome with 2' 0" radius ; the west end is flattened with a width of 2' 0". The south wall is almost entirely built of slabs, while the north and the end walls are of panels from which the roof springs. The remaining part of the roof is formed of slabs of fairly uniform size, one of which measures 4' 6"  $\times$  1' 4".

Decoration :—none.

No. 28A.

A small house in the corner between Nos. 28 and 29 ; broken down, could not be entered.

No. 29.

Roof fallen in, could not be entered. Length about 19' 0".

No. 30.

Condition :—good.

Passage :—6' 3", outer end 2' 10"  $\times$  indeterminate, inner end 1' 9"  $\times$  1' 10", with sill.

Chamber :—20' 8"  $\times$  6' 8"  $\times$  5' 6". Panels of large size ; one opposite door 3' 10"  $\times$  3' 5"

Decoration :—on panel opposite door picture of sailing ship, red on white.

No. 31.

West side passage fallen forward, preventing entrance, otherwise apparently in fair condition.

<sup>1</sup> Ceremonial paddle.

<sup>2</sup> See below, "Summary of Carvings according to Type," *Bird figure*.



## No. 32.

Condition :—roof and sides falling in.

Passage :—6' 1", outer end 1' 7"  $\times$  1' 7", inner end 1' 10"  $\times$  1' 10", with sill still *in situ*, which is placed inside the chamber abutting against the uprights, its two ends do not fit between the uprights. Wall consists in its lower half of panels, in its upper half of slabs.

Chamber :—21' 8"  $\times$  5' 3"  $\times$  4' 9", width of east end 3' 9", of west end 4' 11". The panels have in this case not been built into the wall but are placed against it. They are of large size, one of the biggest is 4' 1" square; another 3' 10"  $\times$  3' 5".

A break occurs in the line of houses between Nos. 32 and 35; Nos. 33 and 34 stand apart under one covering, and slightly to the rear, further from the cliff edge than their neighbours.

The notches on the inner door-post of No. 33 are of interest.

## No. 33. (Plate XI, Fig. 2.)

Condition :—good.

Passage :—6' 6", outer end 1' 8"  $\times$  1' 7", inner end 2' 2"  $\times$  2' 1", with sill; wall entirely of panels, slabs only being used to bring them to the level; floor partly paved.

Chamber :—19' 4"  $\times$  7' 2"  $\times$  5' 8". West end oval, east end flattened to permit of gap between upper portion of panels as communication with No. 34. Panels opposite door horizontal not vertical, one 4' 9" with a height of only 1' 11"; remainder of panels generally low, the wall being principally composed of slabs.

Decoration :—at inner end of passage the west door-post shows on each side a number of rough notches. On one side of the post they form a continuous series, numbering fifty-five; on the other side they are in two series with a break between them, the upper series numbers seven notches, the lower series thirteen. Each notch was said to represent a day spent in the house by the recorders.

Traces of paint on ceiling.

Small pit in front of entrance, 1' 2"  $\times$  1' 0"; depth uncertain.

## No. 34.

Condition :—roof of passage fallen down slightly, making it too low to enter. Otherwise in good condition. It can be seen into from No. 33.

Decoration :—traces of painting on two slabs opposite the door.

Nos. 35 to 39 finish the houses of Orongo proper, or those to the west of the carved rocks. No. 39, which has unique recesses on each side the entrance, abuts on the carved rocks.

## No. 35.

Condition :—roof broken in at north end; passage partly closed.

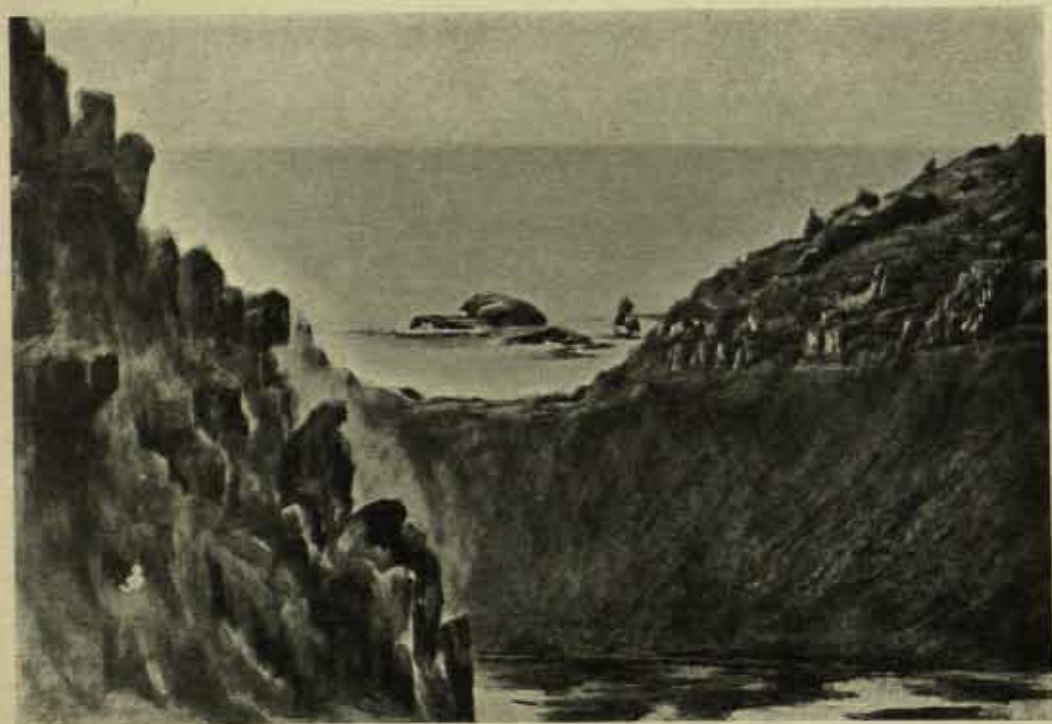
Passage :—indeterminate.

Chamber :—22' 2"  $\times$  6' 7"  $\times$  5' 5". East end oval; west end flat with north corner rectangular, and south corner slightly rounded. Right of door a small recess in wall 2' 0" in length and 1' 0" in height.

Decoration :—some drawings on roof; the subjects could not be determined.

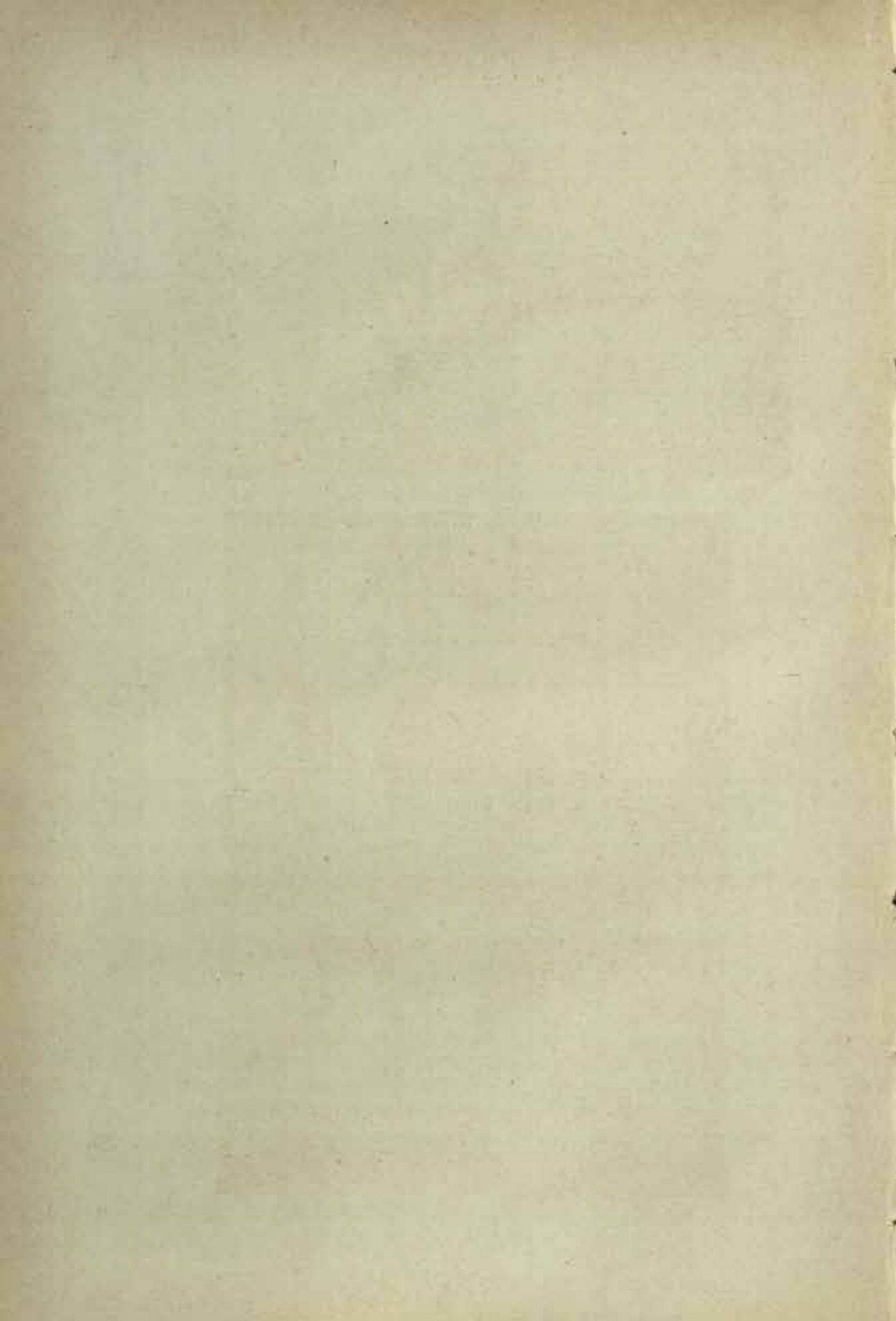


1. RANO KAO FROM ISLET OF MOTU NUL.



2. CRATER OF RANO KAO, ORONGO ON THE RIGHT (SKETCH)  
SURVEY OF VILLAGE AND CARVED ROCKS OF ORONGO.







1. EXCAVATION SHOWING CONSTRUCTION OF BACK OF HOUSES.

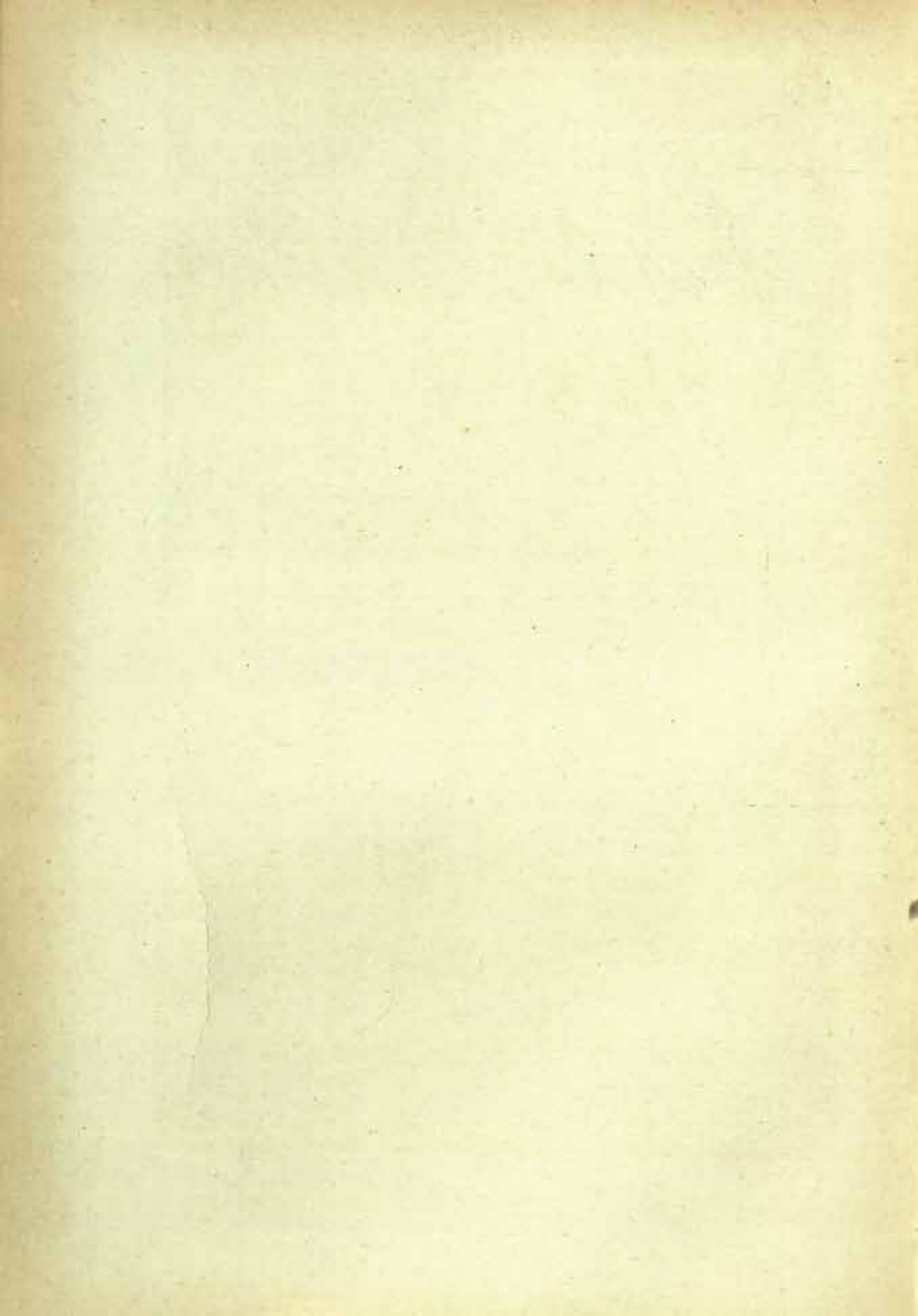


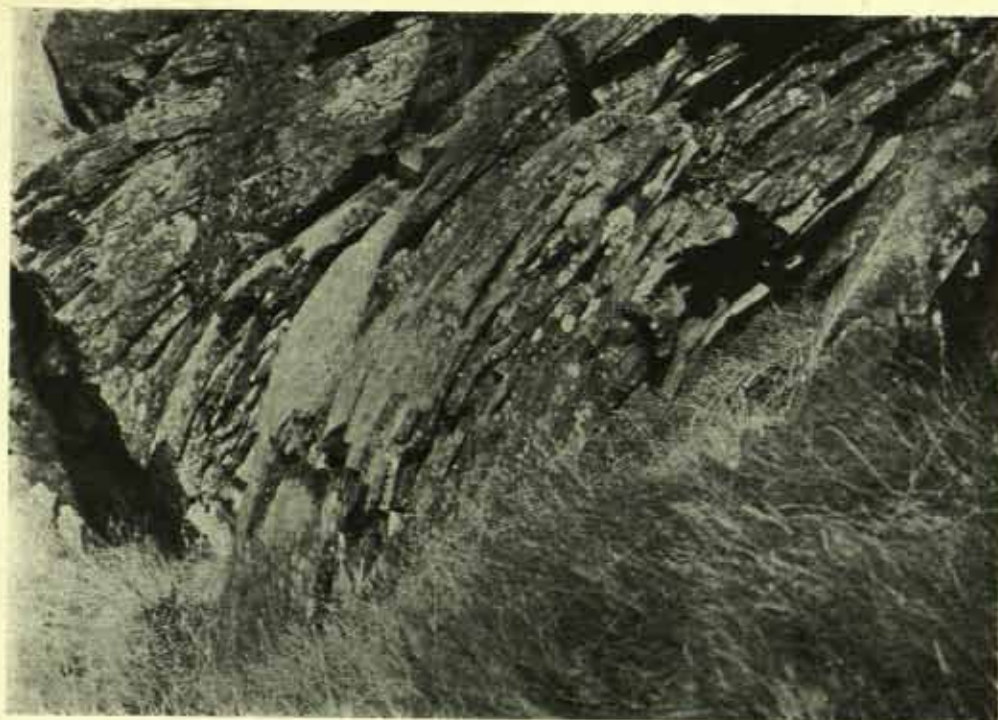
2. PAINTED SLABS (SKETCH).

I.—Two representations of an *ao*, or ceremonial paddle. No. 26.  
II.—A face adorned with paint; a European ship. No. 6.

SURVEY OF VILLAGE AND CARVED ROCKS OF ORONGO.







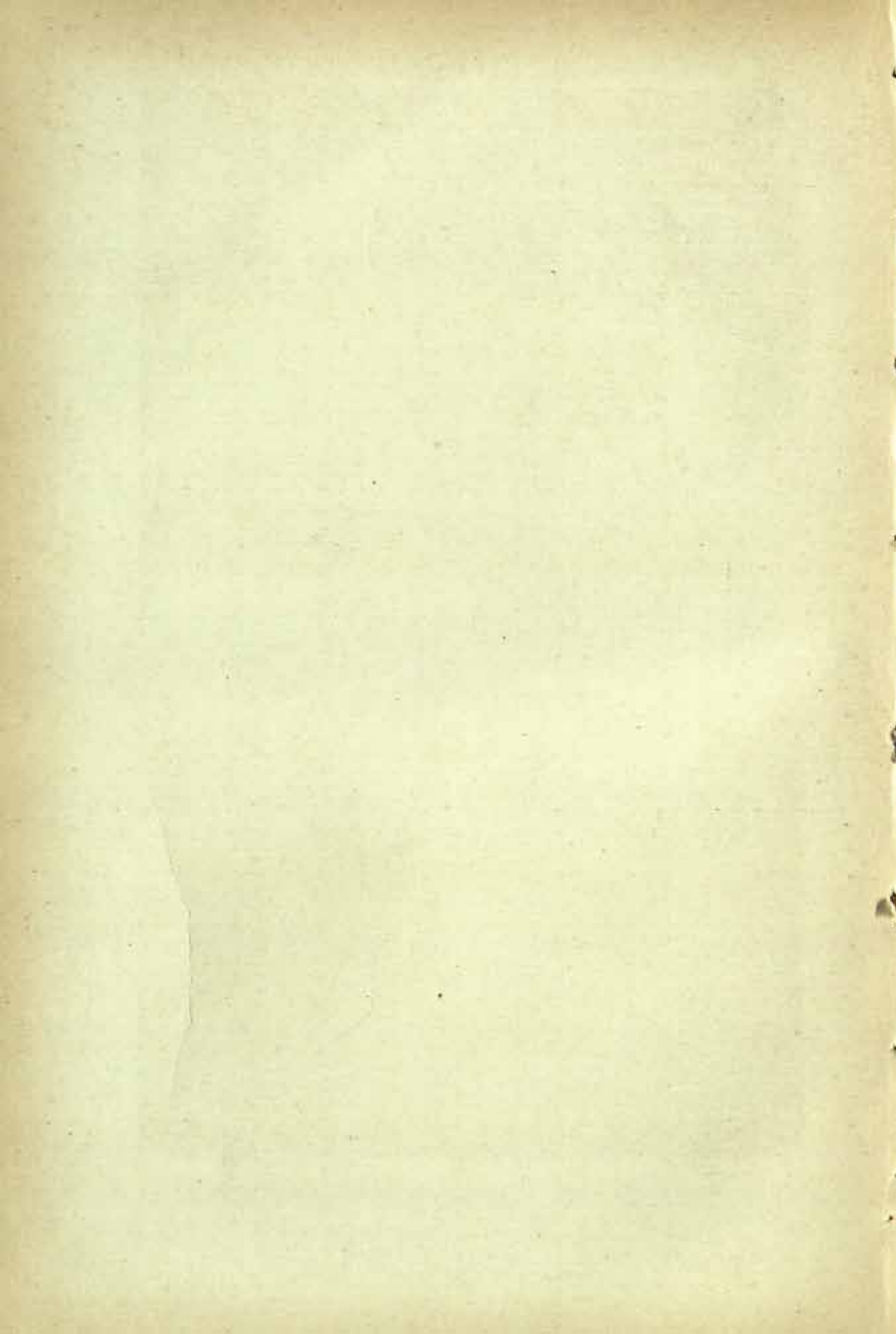
1. GEOLOGICAL SECTION SHOWING CURVED JOINTING IN ROCK USED AS CAPSTONES OF HOUSES.

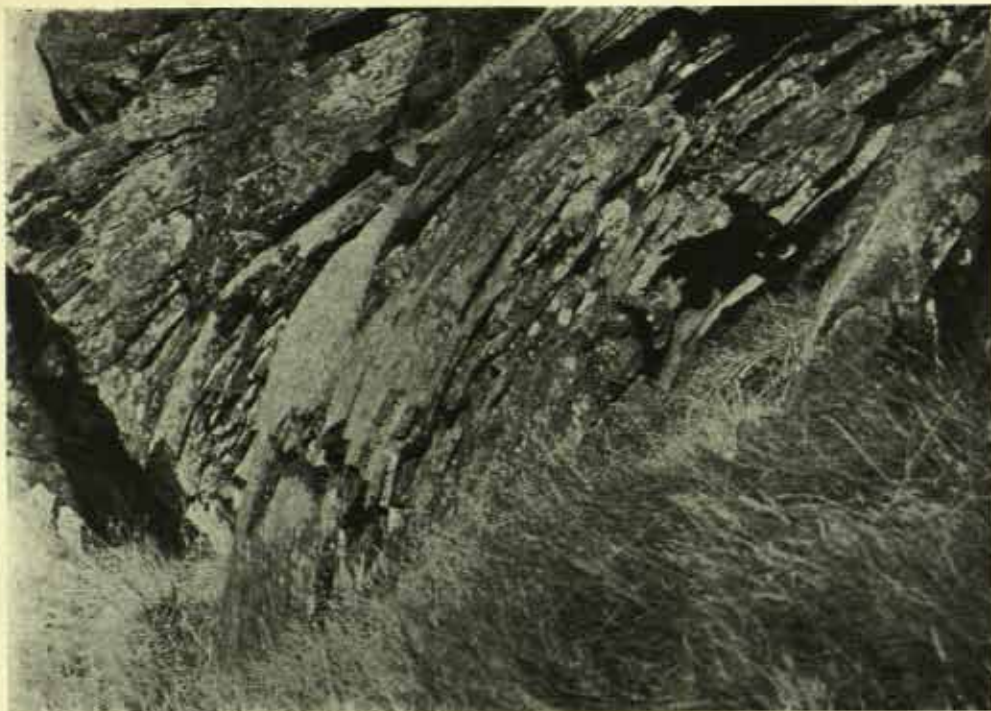


2. CAPSTONES OF HOUSES IN POSITION.

SURVEY OF VILLAGE AND CARVED ROCKS OF ORONGO.







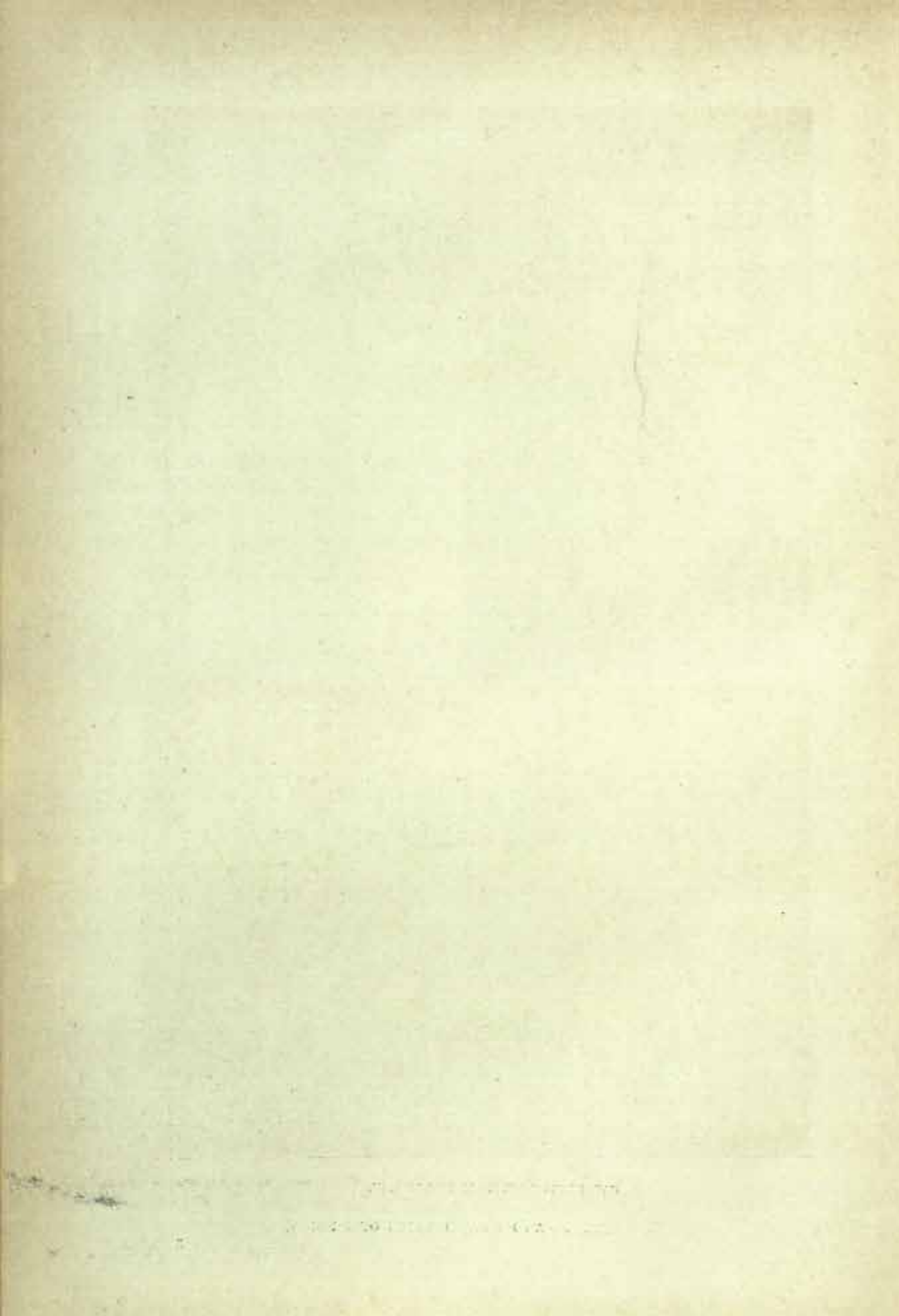
1. GEOLOGICAL SECTION SHOWING CURVED JOINTING IN ROCK USED AS CAPSTONES OF HOUSES.



2. CAPSTONES OF HOUSES IN POSITION.

SURVEY OF VILLAGE AND CARVED ROCKS OF ORONGO.







1. END OF A HOUSE UNROOFED. NO. 2.



2. ENTRANCE PASSAGE UNROOFED. NO. 12.

SURVEY OF VILLAGE AND CARVED ROCKS OF ORONGO







1. A BROKEN DOORWAY, SMALL PIT, AND CARVED STONE. NO. 7.



2. STONE CARVED WITH FACE. NO. 7.

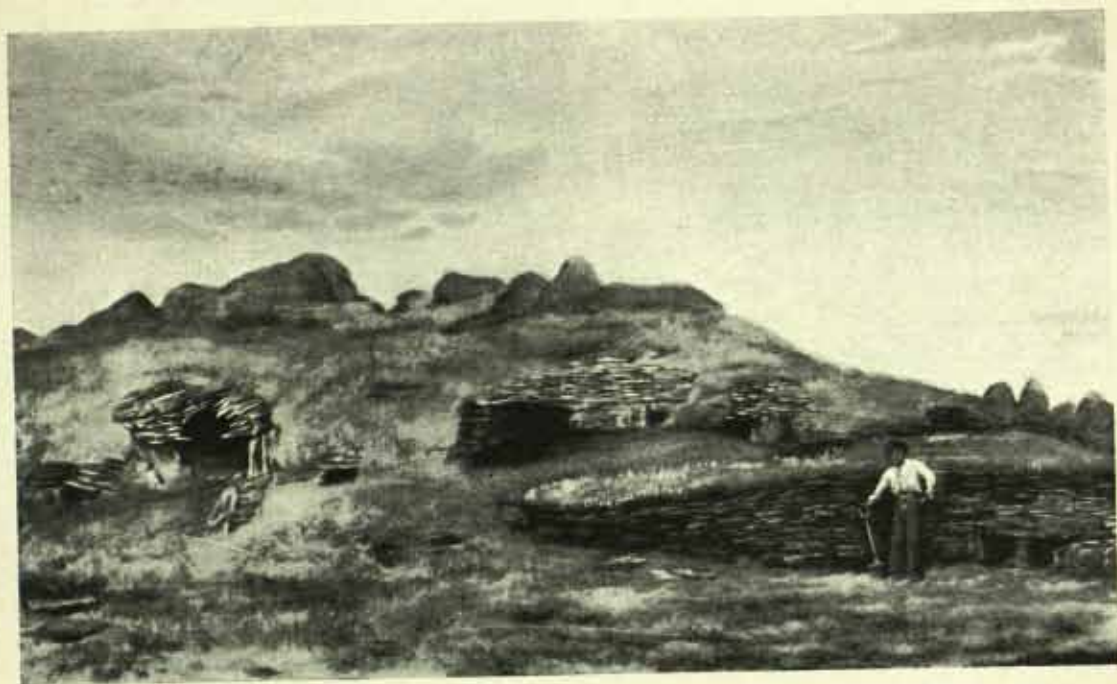


3. A SMALL PIT. NO. 7.

SURVEY OF VILLAGE AND CARVED ROCKS OF ORONGO.







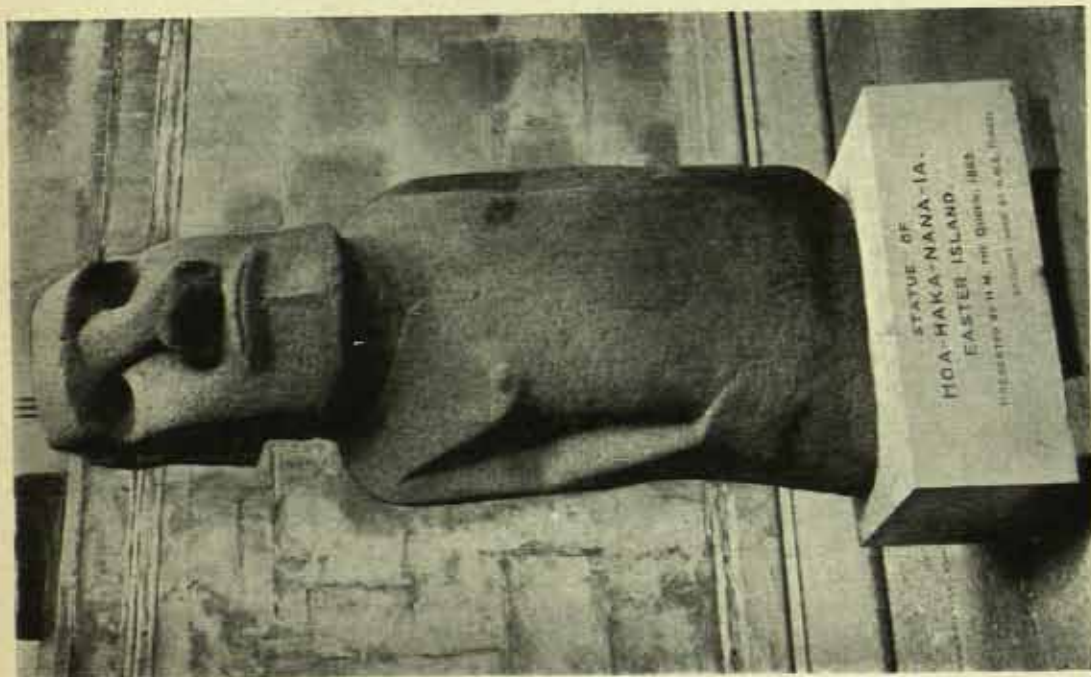
1. CENTRAL HOUSES OF VILLAGE (SKETCH). LEFT TO RIGHT, NOS. 10, 11, 15, 16, 17, 18, AND 22 (DOUBLE ENTRANCE).



2. DOOR-POST, FORMERLY A FOUNDATION STONE, CARVED WITH FACE.  
SURVEY OF VILLAGE AND CARVED ROCKS OF ORONGO.

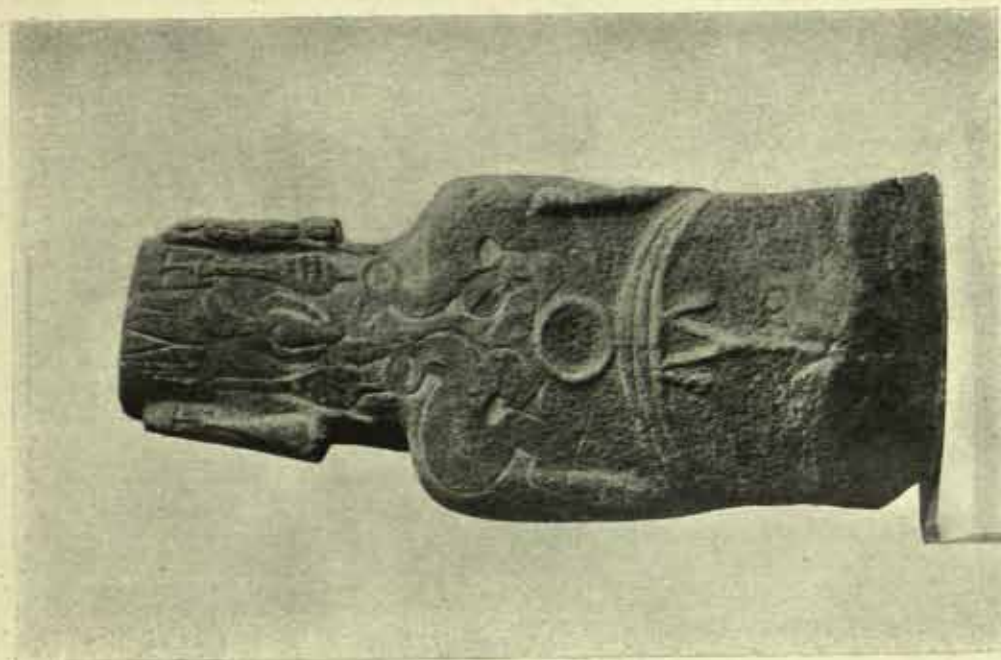






1. STATUE FROM ORONGO, NOW AT BRITISH MUSEUM (FRONT).

SURVEY OF VILLAGE AND CARVED ROCKS OF ORONGO.



2. STATUE FROM ORONGO, NOW AT BRITISH MUSEUM (BACK), SHOWING RING AND GIRDLE; ALSO FIGURES OF BIRD-MAN, BIRD, *ao*, *papa*, AND *ko mari*.







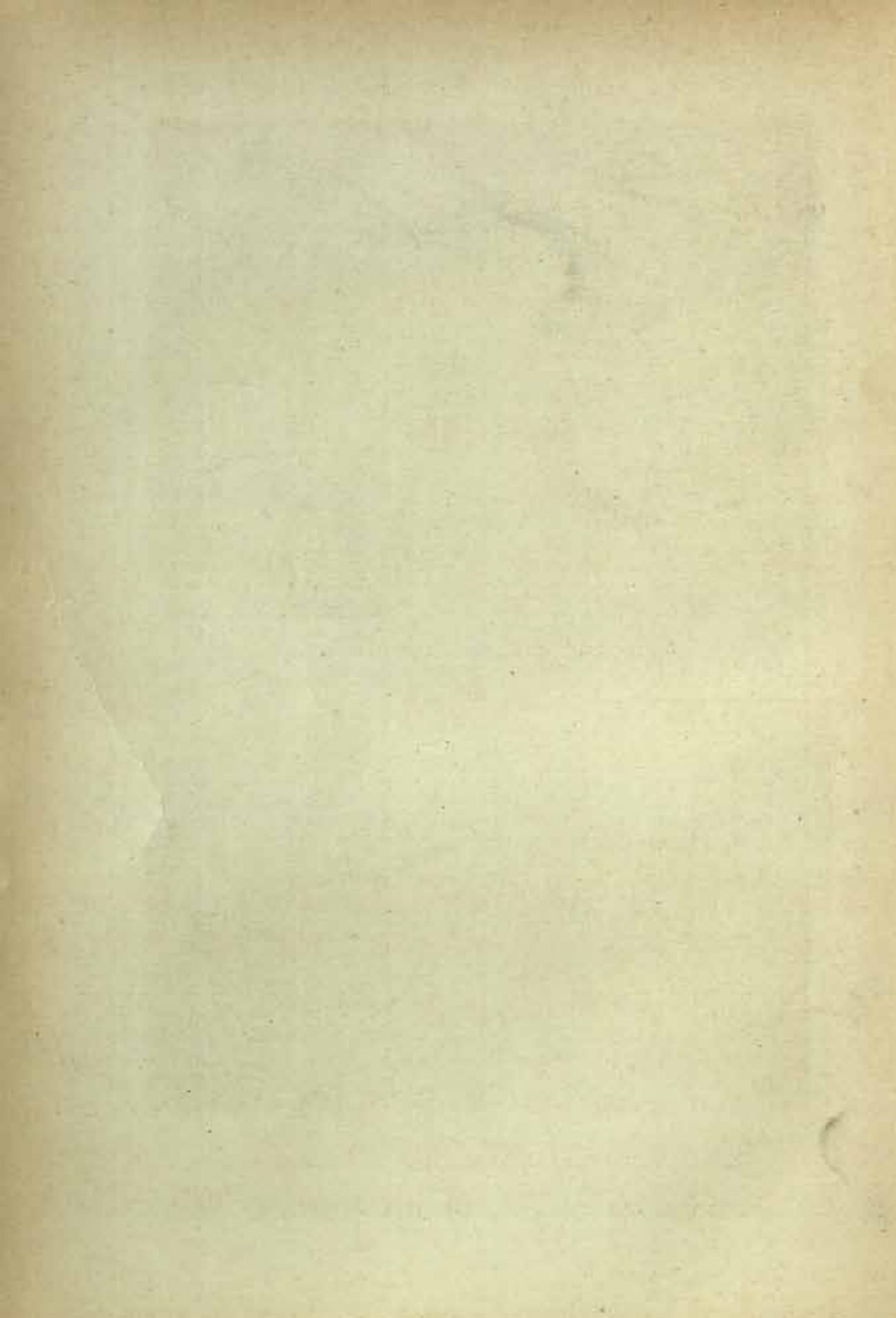
1. HOUSE NO. 11, WHICH CONTAINED THE STATUE.



2. HOUSE NO. 18, WITH CIRCULAR STONE, PROBABLY A PEDESTAL.

SURVEY OF VILLAGE AND CARVED ROCKS OF ORONGO.







1. DOORWAYS OF HOUSES NOS. 26 AND 27.



2. HOUSE NO. 33.

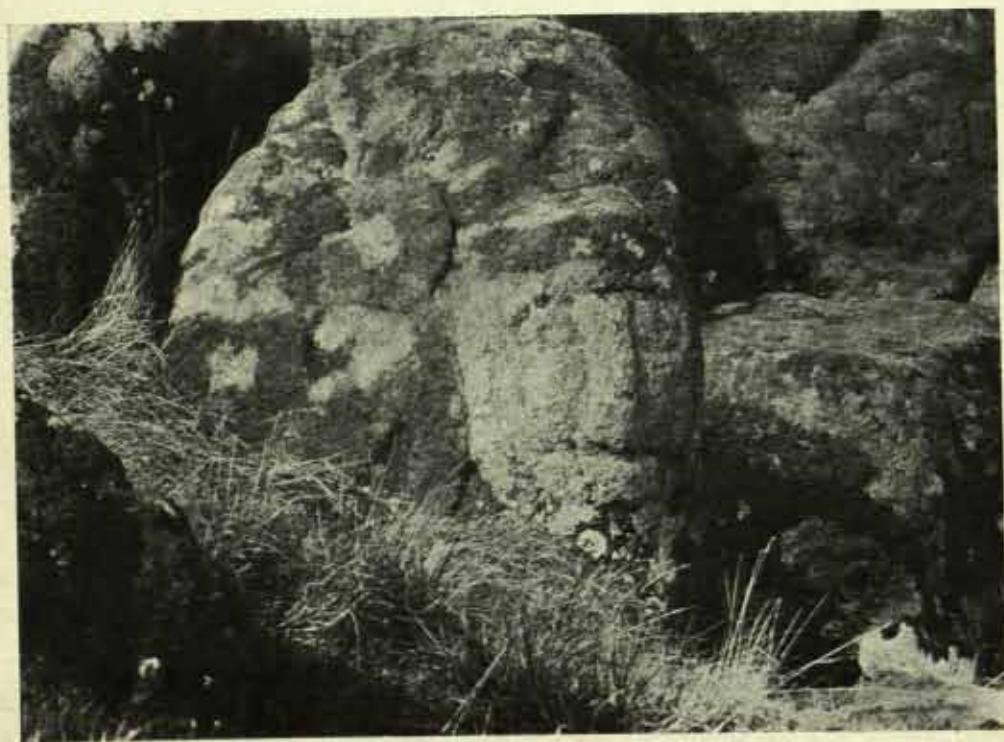
SURVEY OF VILLAGE AND CARVED ROCKS OF ORONGO.







1. WESTERN GROUP OF ROCKS, WESTERN ASPECT.

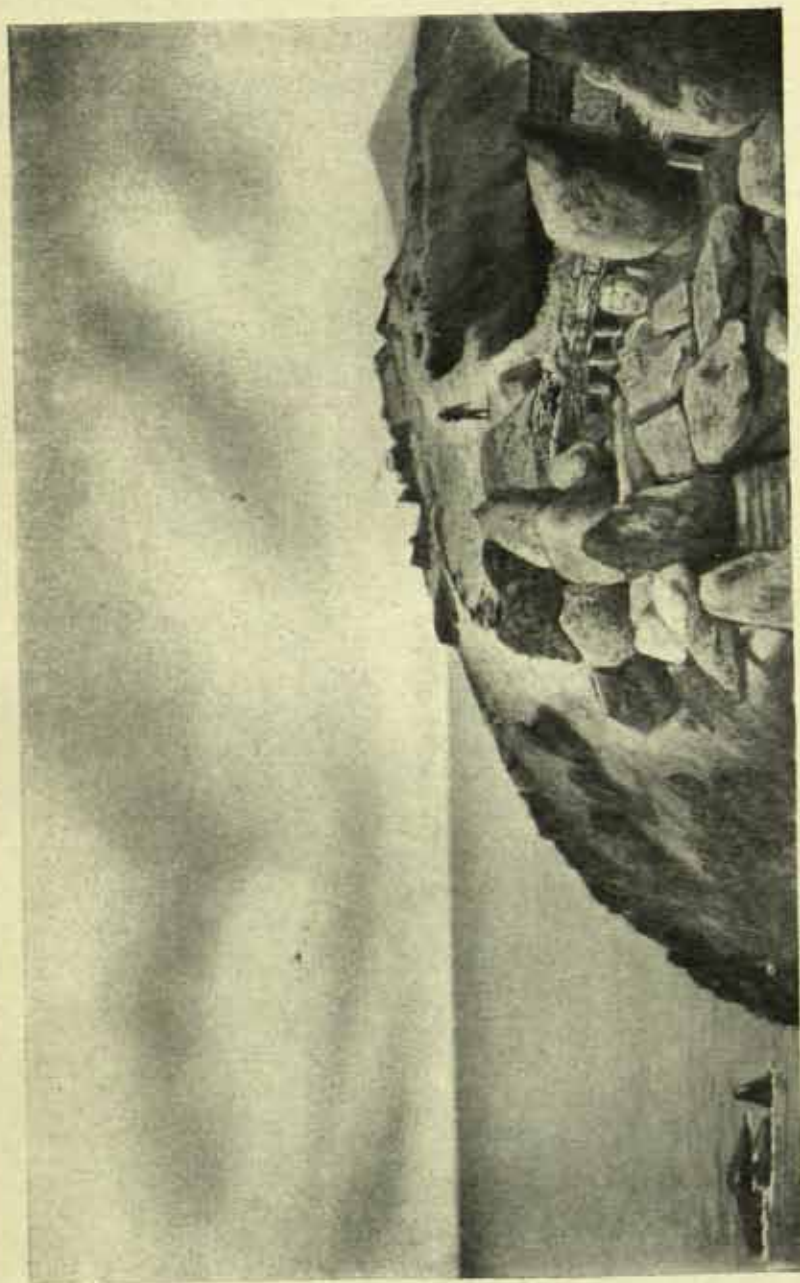


2. FACE CARVED ON WESTERN ROCKS, 1' 4"  $\times$  1' 6".

SURVEY OF VILLAGE AND CARVED ROCKS OF ORONGO.

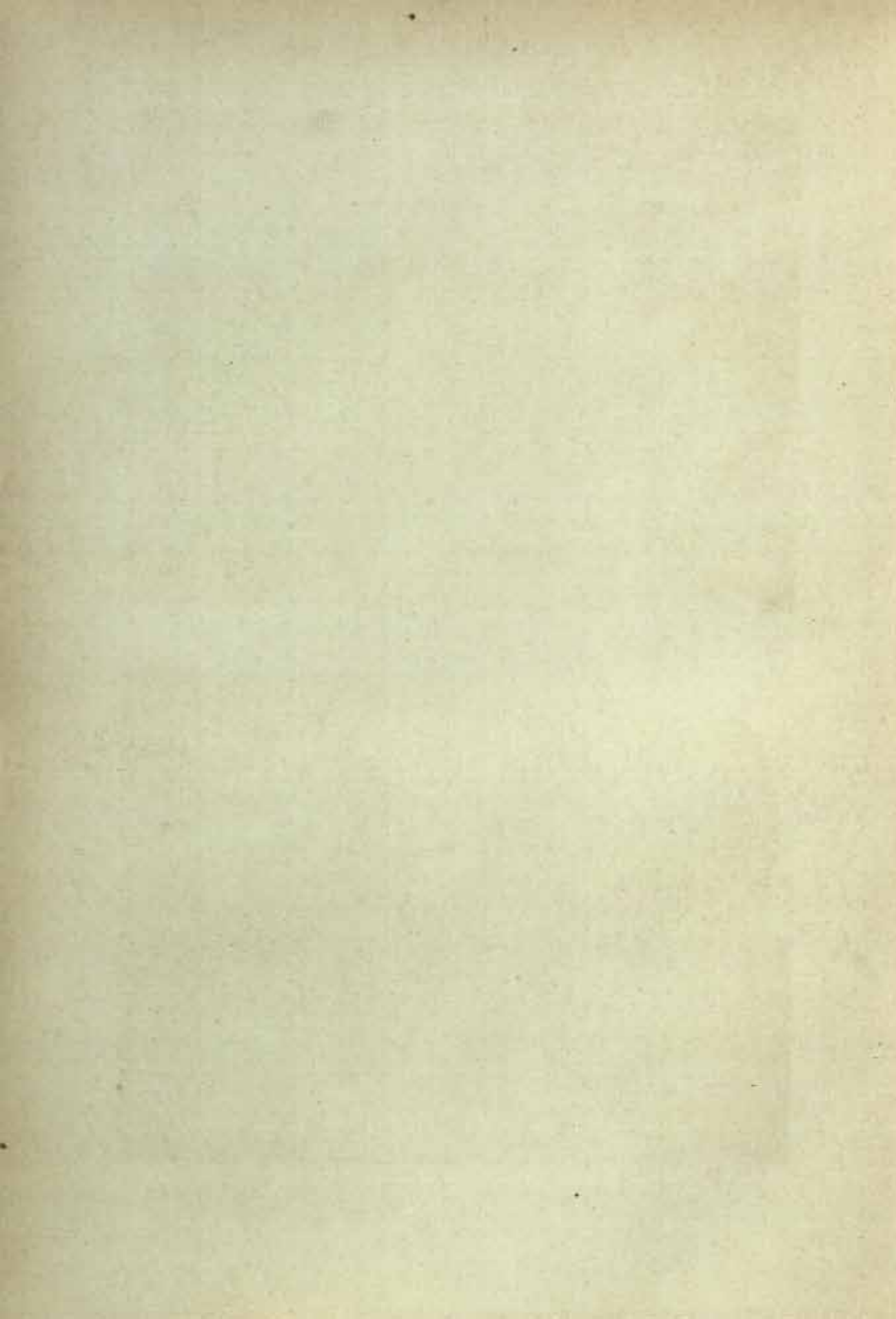






HOUSES NOS. 40 TO 44, AND CARVED ROCKS (SKETCH).







1. HOUSES NOS. 40 TO 43.

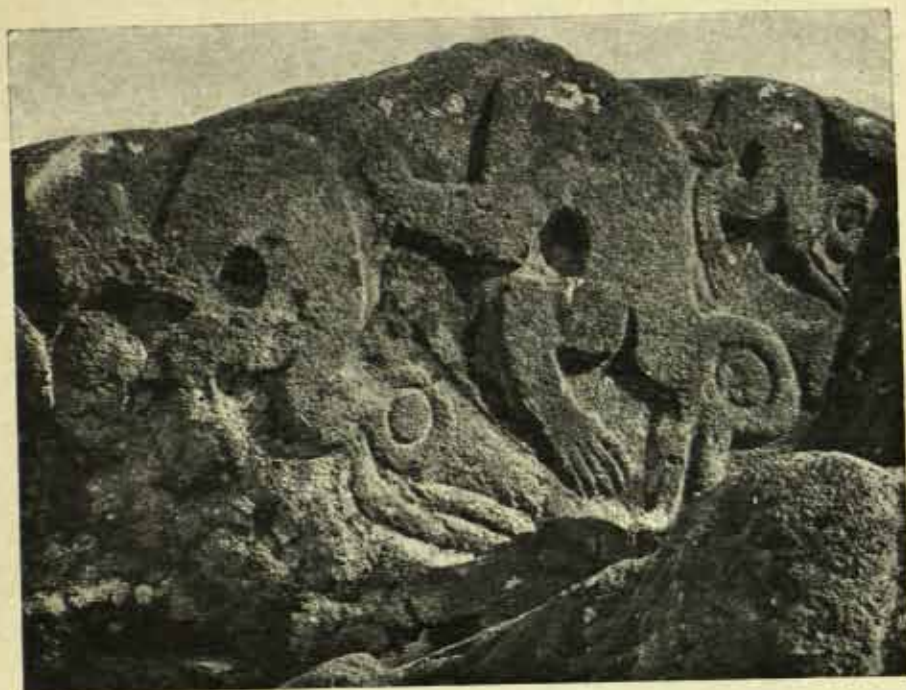


2. WESTERN GROUP OF ROCKS, EASTERN ASPECT.

SURVEY OF VILLAGE AND CARVED ROCKS OF ORONGO.







1. STONE CARVED WITH THREE BIRD-MEN, 6' 0"  $\times$  4' 0"—WESTERN GROUP.



2. CARVINGS OF TWO BIRD-MEN AND A FACE.

SURVEY OF VILLAGE AND CARVED ROCKS OF ORONGO.







1. BIRD-MAN HOLDING EGG.



2. GEOLOGICAL SECTION OF THE CLIFF OF WHICH THE TOP IS THE CARVED HORIZONTAL STONES.



3. BIRD-MAN WITH CROOKED BEAK, HEIGHT 4' 4"; ON LEFT, HANDS HOLDING AN EGG.

SURVEY OF VILLAGE AND CARVED ROCKS OF ORONGO.







1. DOOR-POST BETWEEN NOS. 41 AND 42.



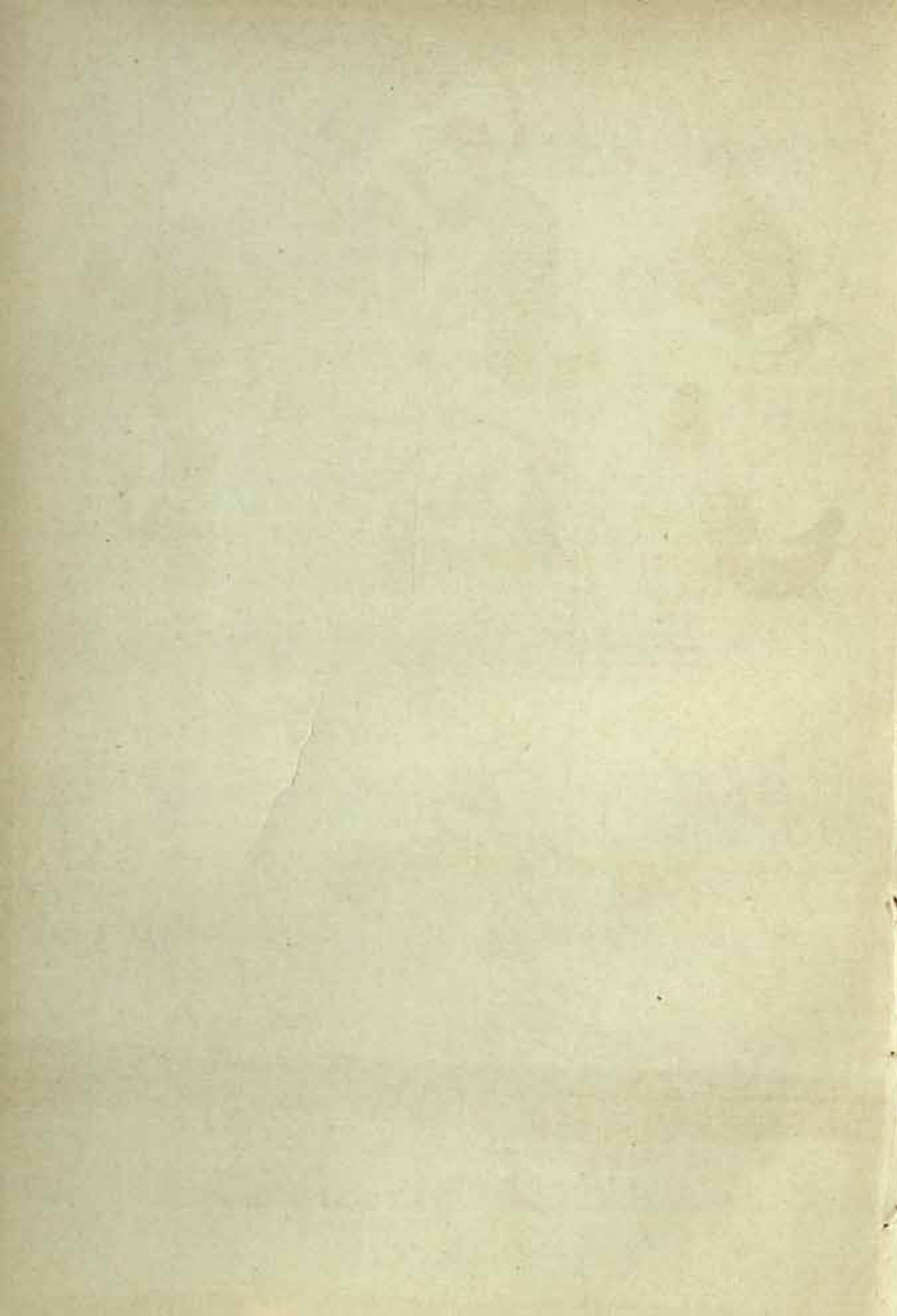
2. "FAN" CARVING ON STONE BETWEEN NOS. 43 AND 44.



3. PORTION OF A PILLOW STONE, CARVED WITH *ko mari* FIGURES.

SURVEY OF VILLAGE AND CARVED ROCKS OF ORONGO.







1. CARVINGS AT ORONGO (SKETCHES): 1. BIRD-MAN WITH FAN FIGURE. 2. BIRD-MAN WITH APPENDAGES. 3. BIRD-MAN SHOWING TWO LEGS AND TAIL. 4. *Ko mari*. 5. NOT KNOWN. 6. *Rei-miro*. 7. BIRD-MAN, DOUBLE FIGURE. 8. BIRD-MAN HOLDING EGG.



From CAVES  
of  
MOTU NUI.

2. CARVINGS FROM MOTU NUI: 1. BIRD WITH JOINTED WING. 2. BIRD CALLING.  
SURVEY OF VILLAGE AND CARVED ROCKS OF ORONGO.





No. 36.

Condition:—exterior of entrance broken down; can be entered by hole in south wall.

Passage:—broken down at outer end, inner end  $1' 5'' \times 1' 11''$ .

Chamber:— $11' 9'' \times 6' 0'' \times 5' 7''$ ; oblong with corners bevelled. Niche in one corner with length (back to front)  $2' 1''$ , width  $1' 10''$ , and height about  $1' 0''$ .

Decoration:—traces of painting on two panels opposite door.

A coping runs about  $1' 0''$  from exterior wall with apparent object of keeping the soil from slipping.

No. 37.

Condition:—good.

Passage:— $6' 6''$ , outer end imperfect, inner end  $2' 0'' \times 2' 8''$ , with sill; walls built of tiles only; partly flagged.

Chamber:— $12' 2'' \times 5' 10'' \times 5' 7''$ . West end rectangular with rounded corners; east end rectangular. Opening at east end to No. 38 between tops of two slabs.

Decoration:—two panels opposite door have been painted, one bears traces of sailing ship, other indeterminate. Ceiling, traces of white paint.

No. 38.

Condition:—a hole in the roof; otherwise good.

Passage:— $5' 9''$ , outer end  $2' 4'' \times$  indeterminate, inner end  $1' 8'' \times 1' 9''$ , no sill; not flagged. In the east wall at the inner end is a small recess, back to front  $9''$ , width  $1' 0''$ , height  $7''$ .

Chamber:— $10' 4'' \times 5' 9'' \times 5' 0''$ , oblong with rectangular ends. Opening to No. 37. Recess on east side of door, on ground level but partly enclosed by a stone across the bottom of the entrance, back to front  $2' 0''$ , width  $2' 3''$ , height  $1' 9''$ .

Decoration:—slabs opposite door, traces of white paint. On roof small birds in white, roughly drawn.

No. 39.

Condition:—Middle of north wall and roof broken down. Exterior entrance broken.

Passage:—about  $5' 2''$ , outer end missing, inner end width  $5' 4''$ .

Chamber:—plan peculiar. Rectangular main chamber  $16' 4'' \times 4' 8''$ ; in addition, on each side of the entrance are two large recesses, concave in form, which extend from the walls of the passage to the respective ends of the house. These recesses measure at each end—that is, at their narrowest points—about  $2' 4''$ . Their roofs are domed. The effect given is that the passage penetrates the house and divides its southern side into two parts.

The final portion of the village, that built among upstanding rocks, seems to be most correctly known, not as Orongo but as Mata-ngarau.<sup>1</sup> (Text-fig. 6; Plates XIII, XIII A, Fig. 1.) The earth covering the rear of houses Nos. 40 to 45 blends with the edge of the crater. Nos. 40 to 44 open on to a small court with a natural pavement of irregular slabs, length from west to east 20 feet, width from north to south 16 feet.

<sup>1</sup> Precisely what this term covered or conveyed is a little vague. It is hoped to discuss it on some future occasion.



On the west and east side of the "court" are vertical rocks, varying in height from some 4 feet to 8 or 10 feet. Both pavement and rocks are covered with carving.

The south side of the court is the edge of the sea cliff, which is here for a short distance almost vertical. The upper part of the face has crumbled away, with the result that a section is exposed, measuring perhaps some 8 to 10 feet in depth. Of this section, the highest part has fractured into the slabs which form the carved pavement aforesaid. The slabs tend to be concavo-convex from below upwards after the manner of the roofing slabs. The central rock of the section has fractured into large quadrilateral cubes. The bottom section is of similar nature to the top layer, but is rubble. At the foot of the section a small portion of the cliff tends to be horizontal, and it is possible to walk with comfort underneath the section. This comparatively level portion is said to have been used for cooking purposes.

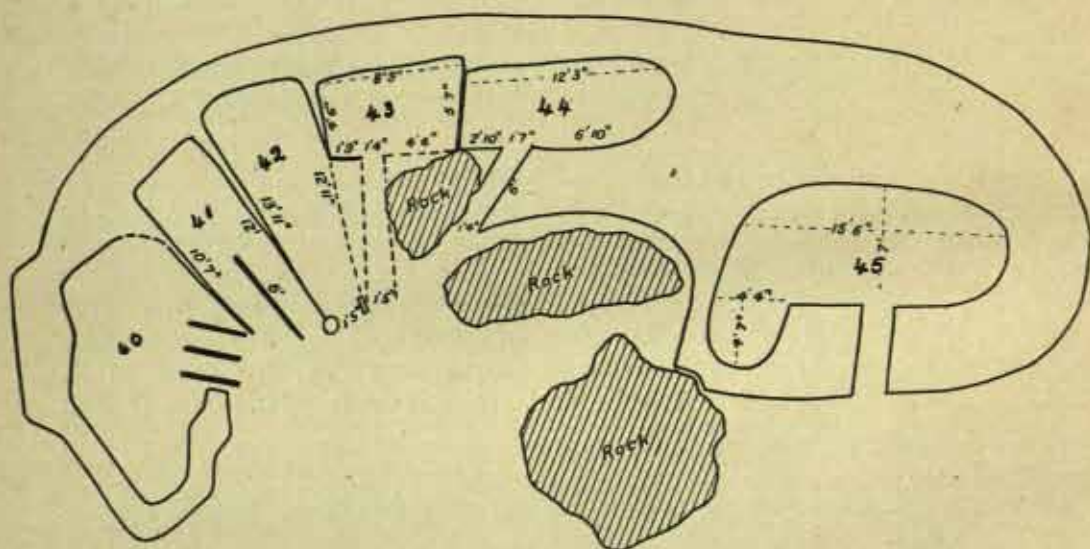


FIG. 6.—GROUND PLAN OF HOUSES NOS. 40 TO 45, SHOWING CERTAIN MEASUREMENTS.

Nos. 40 to 44 may perhaps be most correctly considered as forming one house divided into sections, of which the west end of No. 40, which is oval, and the east end of No. 44, which is also oval, form the respective terminations. No. 45 is of normal type. It was stated independently by more than one native authority that at the great bird festival these houses were lived in by old men, who chanted from the local tablets or script. Nos. 40, 41 and 42 were, it is said, occupied by the experts from Kotuu, or the west side of the island, and Nos. 43, 44 and 45 by those from Hotu Iti, or the east side of the island.

No. 40.

Condition :—roofless and in ruins.

Entrances :—two.

Chamber :—total length 14' 0", but indications in west wall that this may have been divided and formed two houses. West end oval. East end has presumably been rectangular.

No. 41.

Condition :—good.

Entrances :—two, divided by a row of panels which continue half-way into the house.

Chamber :—rectangular in the shape of a fan. Length south end 3' 7", expanding towards the north or crater side. Width west end 10' 7", east end 12' 0".

Decoration :—on the east wall is a figure with body of a lizard and the head and arms of a man. The door-post between Nos. 41 and 42 bears on the lower portion of the south side a roughly carved face. On its west side there are six *ko mari* and at the bottom a composite figure of a *ko mari* with three symmetrical holes on each side.

No. 42.

Condition :—entrance and part of north wall broken down.

Entrance :—the wall between this house and No. 41 diminishes in breadth from north to south and finally consists of one panel only. It terminates in the door-post aforesaid, which partially blocks the entrance.

Chamber :—this is also fan-shaped, radiating from a southern base of 1' 5". West wall 13' 11", east wall 12' 11". Present height 3' 0".

Decoration :—on south wall a figure shaped like a hook.

Object found :—sphagnum. (See house No. 21.)

No. 43.

Condition :—north wall broken down, a stone bowl (*taheta*) has been built into it. Roof off.

Passage :—5' 3". The west wall between Nos. 42 and 43 is partly broken down, but at its outer end the door-post, which is common to both houses, is clearly visible. The door-post at the inner end of the passage is a small foundation stone from thatched house with two holes.

Chamber :—an irregular oblong, walls measuring respectively north 8' 9", south 8' 0", west 4' 6", east 5' 7". It is divided by panels only from No. 44; articles could be passed through. A large carved rock separates the entrances of Nos. 43 and 44.

No. 44.

Condition :—perfect.

Passage :—west wall 5' 0", east wall 6' 0", outer end 1' 4" × 1' 8", inner end 1' 5" × 1' 8"; paved. Outer door-post is a foundation stone from thatched house. A niche forming a cupboard on west side of the passage at the inner end.

Chamber :—length 12' 3"; west end rectangular, 4' 7"; east end oval. Height 4'.

Objects found :—a hammer-stone in passage niche; also one in chamber.

No. 45.

Condition :—fair.

Passage can be traced.

Chamber :—oval, 15' 6" × 7' 0". At west end on south side is a recess with oval termination, 4' 7" × 4' 4".



## CARVINGS ON ROCKS.

A few carved stones are scattered throughout the village and have been alluded to in place, but the most remarkable are those on the rocks at the eastern end. These carvings, in some instances at any rate, antedate the houses between them, which have been built over and conceal the figures. While a few of the carvings stand out conspicuously, most are weathered away in greater or less degree, and have to be carefully sought for. Many also can only be seen at certain times of day, or when the light is propitious. This renders the work of tabulating them very difficult. In all cases, therefore, the "total" number recorded must not be considered as dogmatic statements regarding the number of which traces may remain, still less as to the number which have originally existed.

## SUMMARY OF CARVINGS ACCORDING TO TYPE.

1. *Bird-man.*

This form is the most prevalent, and representations of it appear some 120 times on the end rocks,<sup>1</sup> as well as some four times in the earlier part of the village. It consists of the figure of a man in a crouching position with the head of a bird. It has frequently a hooked beak and gular pouch in a manner reminiscent of the frigate-bird.<sup>2</sup> The hands are usually held up (Plate XV, Fig. 3), and in at least three known cases hold an egg (Plates XV, 1; XVII, 1, No. 8). The figure in at least one case is seated on a human head or skull. In one instance a carved design extends below the buttock which may be a tail, and a crescent springs from the shoulder, possibly representing a wing (Plate XVII, 1, No. 2). The bird-man is always shown in profile, but in an isolated case both legs are depicted as spread out and have a possible tail between them (Plate XVII, 1, No. 3).

Apart from the rocks of Orongo and one or more stones on Rano Kao, at the top of the descent to the crater, it is believed that the design of the bird-man can only be found in two places on the island, at Tongariki on the south coast, and near Ahu Vaitara-kaiua on the north side.<sup>3</sup> In both cases it was roughly carved on horizontal rock.

2. *Bird Figure.*

A figure of a bird occurs some four times on the rocks, and is found in the decoration of some of the houses; it is also seen on the back of the statue Hoa-haka-nanaia (Plate IX, Fig. 2). This bird design is always of the same general character as that found painted on the roof of the cannibal cave (Ana kai-tangata).<sup>4</sup> In the

<sup>1</sup> Previously provisionally given as 111.

<sup>2</sup> See H. Balfour, *Folk Lore*, December, 1917, and *The Mystery of Easter Island*, p. 296.

<sup>3</sup> The carvings scattered throughout the island, of which there are a large number, have not yet been tabulated.

<sup>4</sup> *The Mystery of Easter Island* (Fig. 102).



rough carving, however, on back of the statue the forked tail, which is very prominent there, and can be seen elsewhere, does not appear, possibly for reasons of space.

The figure of a bird with a joint in the outstretched wings, which is found occasionally in the island and also in a cave in the island of Motu Nui, is not found at Orongo. It is illustrated for purposes of comparison (Plate XVII, 2, No. 1).

### 3. *Ko mari* (or *ko marie*).

Next to the bird-man the most frequent symbol is a small geometrical design said to represent the female sex. It occurs most often on the horizontal rocks or "pavement." It was reported that women of the island, possessed of personal attractions, "fine women," came up to this spot to be immortalized after this manner by professional artists, and that each of these designs represented a particular woman. The symbol is frequently found on pillow stones (Plate XVI, Fig. 3),<sup>1</sup> and elsewhere. Total number on rocks, 49.

### 4. *Faces*.

These occur 19 times on the end rocks and two or three times in the village besides those on door-posts. In two cases names were given to them by an old man known as Kapiëra.

### 5. *Rei-miro*.

The breast ornaments of women are pictured twice. In one case one end is geometric, the other represents a face (Plate XVII, 1, No. 6). In the other case, which is close to it, both ends of the *rei-miro* are geometric, but there is a face almost immediately above it.<sup>2</sup>

### 6. *Fan Figure*.

A peculiar figure with lines radiating from a centre forming a section of a circle. If the carving below the buttock of No. 2, Plate XVII, 1, which somewhat resembles the fan, is not counted but reckoned as the tail of the bird-man, the figure in some form occurs three times; once as forming a centre to the bird-man (Plate XVII, 1, No. 1), once on the stone between Nos. 43 and 44, where it is near to but not in any sort of conjunction with the buttock of a bird-man (Plate XVI, Fig. 2), and once roughly and independently scratched on the pavement.

There are a few other carvings not included in the above types, but not sufficiently definite to be classified.

## SUMMARY OF CARVINGS ACCORDING TO POSITION.

### I. *Western Group of Rocks*, between No. 39 and the horizontal stones.

1. Western aspect looking towards the main portion of the village. Total carvings, 21 bird-men and two faces. The face which is most prominent was

<sup>1</sup> This stone is now in the possession of Capt. A. W. F. Fuller, (to whom it was presented by Mr. P. H. Edmunds, of Easter Island) who has kindly consented to the figure of the stone being given in this paper.

<sup>2</sup> In the *rei-miro* in the British Museum both ends are carved as faces. *The Mystery of Easter Island* (Fig. 115).



reported to be known as "Aringa-o-Tupa" (face of Tupa), and to represent "a man who slept in No. 39."

2. Eastern aspect looking towards the horizontal stones or pavement (Plate XIII A, Fig. 2). The most prominent carvings are on an upper rock on the seaward side and consist of three bird-men in an inverted position (Plate XIV, Fig. 1). Below this is the bird-man, and fan composite figure and near it two birds, also a *rei-miro*. A large rock on the grass at a still lower level is nearly descending into the sea; it has numerous carvings.

One of the lowest rocks on the landward side, next to the entrance to No. 40, had to be excavated and the carvings were found well preserved. They consisted of two bird-men back to back with a face between (Plate XIV, Fig. 2). Total carvings, 18 bird-men, 3 birds, 5 faces, 1 *rei-miro*.

## II. Eastern Group of Rocks, forming the conclusion of village.

1. Western aspect looking towards the horizontal stones or pavement. The rocks of this group are more detached than those of the western. The solitary stone which stands between the entrances to No. 43 and No. 44 has been also included. It bears several bird-men, and on the top a face said to represent "Tukihiva-a-Haumoana." At the bottom of the same stone near the entrance to No. 43 is the fan figure (Plate XVI, Fig. 2). (See above, p. 449.)

A big stone (Plate XV, Fig. 3), on the east side of the entrance to No. 44, shows a large bird-man; the back of the head and figure are almost obliterated, but the hands are clear and hold an egg. Next to this last is a vertical rock, in shape resembling a tombstone said to be known as "Haré-o-Viki." Its western face is covered with a bird-man strikingly unweathered. The marked feature of this figure is the manner in which the beak has been curved, apparently to accommodate it to the space available.<sup>1</sup> A conical stone stands on the sea side among the horizontal stones of the pavement. The bird-man on it also holds an egg. Total carvings, 27 bird-men, 3 *ko mari*, 1 face, 1 fan figure.

2. Eastern face, looking towards narrowest part of crater rim. The rocks on this aspect are much weathered and much carving has probably disappeared. Total carvings, 10 bird-men.

## III. Northern Group of Rocks.

On back side of houses Nos. 40-44, and facing crater, are two carved stones with a total of 7 bird-men and 2 *ko mari*. Here is the bird-man with the unique appendages which may represent a tail and wing (Plate XVII, Fig. 1, No. 2. See p. 448). Two other bird-men face each other with hands and feet united (Plate XVII, Fig. 1, No. 7).

<sup>1</sup> In Plate XII, Fig. 1, this stone can be seen between the stones of the western group, but is not one of them.

IV. *Horizontal Stones or "Pavement"* between houses Nos. 40-44 and the edge of the cliff.

Here the *ko mari* figure is most numerous, being found all over the pavement. Near the south or seaward edge on the west side and close to the similar figures on the west group of rocks is a *rei-miro* figure, with face at one end. (See above, p. 449, Plate XVII, Fig. 1, No. 6.) Below the edge, on a vertical face towards the sea, is the bird-man with two extended legs. (See p. 448.) There are also two faces. On the north side the pavement opposite the entrances to houses Nos. 40-44 is lower than the general level, and had become filled with soil and débris. Excavation, though it failed to reveal, as had been hoped, matter giving clue to date, or of other first-class interest, brought to light some comparatively unweathered carving. Also a detached stone on which the bird-man, though somewhat worn, very clearly holds an egg.<sup>1</sup> (Plate XV, Fig. 1.)

Total carvings on these horizontal rocks are 44 *ko mari*, 37 bird-men, 11 faces, 1 *rei-miro*, 1 bird and 1 fan figure; this includes 1 bird-man, and 2 faces on their seaward or vertical aspect.

One or more rocks beyond the village bear traces of carving.

<sup>1</sup> This stone can be seen in Plate XIII A, Fig. 1, removed from lower level and placed on pavement. It is now at the British Museum. For photograph from a cast made by Mr. H. Balfour, see *The Mystery of Easter Island*, Fig. 112.



## MASKS AND MOIETIES AS A CULTURE COMPLEX.

By A. L. KROEBER AND CATHARINE HOLT.

IN 1905, Graebner and Ankermann published synchronous articles<sup>1</sup> in which they distinguished a number of successive layers of culture in Oceania and Africa. This scheme Graebner subsequently developed in an essay which traced at least some of these culture strata as far as America.<sup>2</sup> Graebner's theory has been accepted, with or without reservations, by a number of authorities, including Foy,<sup>3</sup> W. Schmidt,<sup>4</sup> and Rivers.<sup>5</sup> The sequence of cultures recognized is Tasmanian Nigritic, Southeast Australian Nigritic, West Papuan or Patrilineal Totemic, East Papuan or Matrilineal Two-class, Melanesian or Bow, Proto-Polynesian, Late or North Polynesian, Indonesian. Each of these culture strata is characterized by a combination or complex of certain elements. Some of the principal of these distinguishing components of the several culture complexes are:—

*Tasmanian*: cremation, windbreak, throwing sticks, scarification.

*Southeast Australian*: boomerang, bee-hive huts, parrying shield, coiled basketry, knocking out of teeth.

*West Papuan*: patrilineal and totemic local groups, totem increase rites, scaffold burial, circumcision, spear-thrower, conical hut, bark or dug-out canoe.

*East Papuan*: matrilineal moieties, secret societies with masks, skull worship, gabled houses and tree houses, carpentered canoe of planks, fire-saw, pan-pipe, knobbed clubs.

*Melanesian*: flat self-bow, crutch paddle, bamboo comb, pile dwellings, skin drum, hammock, head-hunting, pig, betel, sago, spiral ornamentation.

<sup>1</sup> "Kulturkreise und Kulturschichten in Ozeanien" and "Kulturkreise und Kulturschichten in Afrika," *Zeitschrift für Ethnologie*, XXXVII, 28-53 and 54-90, 1905.

<sup>2</sup> "Die Melanesische Bogenkultur und ihre Verwandten," *Anthropos*, IV, 726-780, 998-1032, 1909.

<sup>3</sup> *Führer durch das Rautenstrauch-Joest Museum*, Cologne, 1906.

<sup>4</sup> "Die Kulturhistorische Methode in der Ethnologie," *Anthropos*, VI, 1010-1036, 1901; "Die Gliederung der Australischen Sprachen," *ibid.*, VII, 230 *seq.*, 1912; "Kulturkreise und Kulturschichten in Süd-Amerika," *Zeitschrift für Ethnologie*, XLV, 1014-1124, 1913.

<sup>5</sup> "The Ethnological Analysis of Culture," *Report of the British Association for the Advancement of Science for 1911*, 1-10. Rivers accepts Graebner's method of attack rather than his results.



*Proto-Polynesian*: canoe with single outrigger, triangular sail, composite fish-hook, flattened clubs, fire-plough, caste and taboo system.

*North Polynesian*: sail attached to mast, shark tooth weapons.

*Indonesian*: double outrigger, square sail, blow-gun.

Under the Graebnerian hypothesis, the foregoing elements, in whatever part of the world they may now be found, go back to a migration of people or a stream of influence emanating from the culture that first evolved the elements in question.

The present study was undertaken at the personal suggestion of Foy to test a portion of the hypothesis, as a sample of the validity of the whole, against the facts as they are available in North American ethnography. If for instance moieties and masks were really associated as integral members of the "East Papuan" culture, and this culture spread as a unit from Oceania or Asia to America, then those American Indian tribes that were seriously affected by this East Papuan culture should normally possess both moieties and masks, while those that remained uninfluenced should lack both. In other words, two elements associated in one of Graebner's cultures should show a positive correlation in their distribution. If the correlation proved negligible or absent, the elements must have developed independently or have been introduced separately. In the latter case the history of the diffusion of each element might still be traced from one continent to another, but the unified or integrated culture complexes that Graebner posits as origins would be proved unreal.

The assemblage and analysis of the data that follow has been the work of Holt, while Kroeber is responsible for the methodological discussion.

A review of the literature for America, north of Mexico, results as follows<sup>1</sup>:—

1. *Tribes having masks and exogamous moieties.*

Tlingit (Swanton, B.A.E.-R., XXVI, 398, 435-436, 463, 1908; Dall, B.A.E.-R., III, 110-136, 1884; Boas, U.S.N.M., 1895, 323, 1897; Boas, B.A.E.-R., XXXI, 498, 1916). Haida (the three last cited, pp. 110-120, 323, 480, respectively).

Miwok (Gifford, U.C., XII, 139-141, 1916). Salinan (Mason, U.C., X, 189, 1912; Gifford, U.C., XI, 295, 1916; and inf'n Kroeber).<sup>2</sup>

<sup>1</sup> Abbreviations: A.A., *American Anthropologist*; A.A.A.-M., *Memoirs of the American Anthropological Association*; A.M.N.H.-A.P., -B., -H., -M., *Anthropological Papers, Bulletin, Handbooks, Memoirs of the American Museum of Natural History*; B.A.A.S., *Reports of the British Association for the Advancement of Science*; B.A.E.-B., -R., *Bulletins, Reports of the Bureau of American Ethnology*; C.I.A., *Congrès International des Américanistes*; J.A.F.L., *Journal of American Folk-Lore*; U.C., *University of California Publications in American Archaeology and Ethnology*; U.S.N.M., *Reports of the U.S. National Museum*.

<sup>2</sup> Curtains of cord, grass, or feathers worn by initiated dancers impersonating spirits in the California area have been counted as masks because they disguise the identity of the wearer in ritual.



*Tribes having masks and non-exogamous moieties.*

Tewa (Goddard, A.M.N.H.-H., No. 2, 98, 107, 1913).

Hidatsa (Lowie, A.M.N.H.-A.P., XI, 292, 315, 1913, and inf'n). Mandan (Will and Spinden, *Pap. Peabody Museum*, III, 129-131, 1906; Brower, *Mem. Explor. Basin Mississippi*, VIII, St. Paul, 1904). Omaha (Fletcher and La Flesche, B.A.E.-R., XXVII, 370, 481, 1911). Iowa (Skinner, A.M.N.H.-A.P., XI, 713, 1915; B.A.E.-B., XXX).

Iroquois (Dall, B.A.E.-R., III, 144-145, 1884; Goldenweiser, *Anthropology in North America*, 1915).

*2. Tribes having masks but no moieties.*

Eskimo of Alaska (Dall, B.A.E.-R., III, 110-136, 144-145, 1884; Nelson, B.A.E.-R., XVIII, 322, 393, 1899). Eskimo of Hudson Bay (Boas, B.A.E.-R., VI, 608, 1889). Eskimo of Baffin Land (*ibid.*, 605-606). Kutchin (Chapman, C.I.A., XV, pt. 2, 16-32, 1907; Swanton, A.A., n.s. VII, 667, 1905).

Tsimshian (Boas, U.S.N.M., 1895, 323, 1897; Boas, B.A.E.-R., XXXI, 480, 539, 1916). Niska (Boas, B.A.A.S., LXV, 569-571, 1895). Bella Coola (Boas, B.A.A.S., LXI, 412-414, 1891; Heiltsuk (Boas, B.A.A.S., LIX, 825-827, 1890; U.S.N.M., 1895, 621-661, 1897). Kwakiutl (Boas, B.A.A.S., LIX, 825-827, 1890; *ibid.*, LX, 617, 1890; U.S.N.M., 1895, 328, 435, 1897). Nutka (B.A.A.S., LX, 583-584, 1890). Maka (Dall, B.A.E.-R., III, 106, 1884; Lewis, A.A.A.-M., I, 153-156, 1906). Clallam, Lummi, Squamish (*ibid.*), Lkungen (Boas, B.A.A.S., LX, 569, 1890, U.S.N.M., 1895, 645, 1897).

Lillooet (Teit, A.M.N.H.-M., IV, 257-258, 1906). Thompson (A.M.N.H.-M., II, 299, 1900). Shushwap (Teit, A.M.N.H., IV, 612, 1909).

Pomo (Barrett, U.C., XII, 407, 1917, and inf'n Gifford). Maidu (Dixon, A.M.N.H.-B., XVII, 223, 289, 1905). Wintun, Costanoan (inf'n Kroeber).

Hopi (Fewkes, B.A.E.-R., XIX, 573-633, 1900 [1902]; Fewkes, B.A.E.-R., XXI, 3-126, 1903). Zuñi (Stevenson, B.A.E.-R., XXIII, passim, 1904; Kroeber, A.M.N.H.-A.P., XVIII, 94, 1917). Navaho (Matthews, A.M.N.H.-M., VI, 55-57, 1902; B.A.E.-B., XXX, pt. 2, 44, 1910). Mescalero Apache (Goddard, A.M.N.H.-H., No. 2, 127-128, 1913). Chiricahua Apache (*ibid.*, B.A.E.-B., XXX, 282-284). Pima (Russell, B.A.E.-R., XXVI, 266, 1908; Goddard, A.M.N.H.-H., No. 2, 161, 1913).

Arikara (B.A.E.-B., XXX, 83-86; Lowie, A.M.N.H.-A.P., XI, 661, 1915). Crow (*ibid.*, 207; Goldenweiser, *Anthropology in North America*, 370, 371, 1915). Assiniboine (Lowie, A.M.N.H.-A.P., IV, 65-66, 1909). Blackfoot (Wissler, A.M.N.H.-A.P., VII, 424, 1911). Plains Cree (Skinner, A.M.N.H.-A.P., XI, 517, 530, 1914). Plains Ojibwa (*ibid.*, 481-482, 500).

Delaware (Skinner, A.M.N.H.-A.P., III, 21, 1909; Swanton, A.A., n.s. VII, 666, 667, 1905).



## 3. Tribes having moieties but no masks.

Cahuilla, Cupeño, Serrano, Western Mono (non-exogamous), Central Yokuts (Gifford, U.C., XI, 292, 1916, and U.C., XIV, 155-219, 1918, and inf'n Kroeber).

Winnebago (inf'n P. Radin).

## 4. Tribes having neither moieties nor masks.

Greenland Eskimo (Dall, B.A.E.-R., III, 145, 1884).

Hupa (Goddard, U.C., I, 1-88, 1903). Chimariko (Dixon, U.C., V, 301, 1910).

Shasta (Dixon, A.M.N.H.-B., XVII, 451, 1907). Luiseno, Diegueño,

Cocopa, Kamia, Yuma, Mohave (Gifford, U.C., XIV, 155-219, 1918).

Southern Yokuts, Tübatulabal, Kawaiisu (*ibid.*). Yurok, Karok, Kato,

Wappo, Yana, Achomawi (inf'n Kroeber).

Gros Ventre (Kroeber, A.M.N.H.-A.P., I, 147, 1908). Northern Shoshone (Lowie, A.M.N.H.-A.P., II, pt. 2, 1909).

Yuchi (Speck, *Anthr. Publ. Univ. Penn.*, I, 73, 113, 1909).

To sum up, there are 72 groups or tribes for which the fact was definitely established whether or not they used masks and whether or not they had moieties. These classify into—

|                                |    |    |       |    |
|--------------------------------|----|----|-------|----|
| Masks and moieties (exogamous) | .. | .. | ..    | 5  |
| " " " (non-exogamous)          | .. | .. | ..    | 5  |
|                                |    |    | —     | 10 |
| Masks but no moieties          | .. | .. | ..    | 35 |
| Moieties but no masks          | .. | .. | ..    | 6  |
| Neither masks nor moieties     | .. | .. | ..    | 21 |
|                                |    |    | <hr/> | 72 |

That is, there are 41 instances where the Graebner theory fails as against 31 where it holds true. But out of these 31 "favourable" instances, 21 are negative. If moieties were of more general occurrence, or masks less general, and if the two occurred together more often than not, then the absence of the one feature when the other is absent might be significant. But as it is, the scarcity of positive cases would seem to render the negative ones of less value.

The case can also be put thus: 45 tribes out of 72 use masks, or 5 out of every 8 of the total number examined. If a true correlation existed between the two traits, then the 16 moiety-divided tribes ought to use masks in a heavy preponderance of cases while the moietyless tribes would rather tend to be also maskless. But of the 16 tribes with moieties, 10 have masks, 6 are maskless, giving a ratio of 5:3; and of the 56 moietyless tribes 35 have masks, 21 have not, giving the identical ratio of 5:3. That is, a tribe is equally likely to have masks whether or not it possesses moieties. In short, the occurrence of the two traits in relation to each other comes out exactly according to the laws of random chance; the correlation is zero.



Further, the Graebner theory assumes as a matter of method that a culture trait never develops twice. All cases of geographically isolated occurrences of a trait must be laid to migration or diffusion and subsequent loss of the trait in the intervening regions. A culture wave characterized by two traits is established as having affected a people even if only one of the two traits is now found among them. On this basis, the majority of North American tribes, perhaps all of them, would have been reached by the East Papuan or "Two-class" culture; 10 have both masks and moieties, 35 masks only, 6 moieties only, or a total of 51 out of 72. Even the remaining 21 might have come under this cultural wave and then have happened to lose both traits. But of the 51 concerning which the theory would be positive, only 10 now show both traits. For four-fifths of the tribes the theory is forced to assume that the evidence for coupling once existed, but can no longer be brought.

This is not so very different from the old methodology of survivals; where you found a survival, it proved your case, but when you failed to find it, something had happened to cause a change instead of a survival.

So much for the "criterion of quantity" as applied to the Graebner theory in a particular region.

The Graebner method as it has been used in practice possesses several critical virtues:—

- (1) It represents an honest and important endeavour to free culture history from the ban of being resolved directly into psychology, and attempts instead to explain it in terms of culture.
- (2) It does not resolve culture phenomena directly or principally into factors of geographical environment.
- (3) It attempts, professedly at least, to explain the history not only of discrete culture elements, but also of the culture wholes or organisms in which these elements occur.
- (4) It aims to introduce the time factor into data which come to us in momentary section. That is, it tries to convert ethnography into history.

On the other hand, this method is open to criticism at the following points:—

- (1) It denies the possibility of parallel independent invention or convergence, instead of delimiting apparent cases by critical examination. It is true that "converged" culture traits are rarely identical; but neither are the several occurrences of traits which we know to have had a single origin ever quite identical. What is needed in *every* instance is analysis, not a ruling out of anything.
- (2) The method wipes out, practically, the space factor, from which the time element can best be reconstructed when it is not given by the data. Of course, knowledge of geographical distributions alone will not answer all problems even of relative chronology. But to disregard spatial



continuities and discontinuities is a gratuitous renunciation of perhaps the most productive of all media of sure attack. This fault the method shares with the old psychologico-evolutionistic method of ethnology.

- (3) While there undoubtedly are not only isolated culture traits but complexes of culture traits that spread from people to people, the Graebner scheme posits elaborate complexes, entire cultures, in fact, to operate with. Except where the diffusion of such complete cultures is historically documented, an explanation in terms of them is obviously less sound—more hypothetical, and more summary—than explanations in terms of single elements, or of small complexes that have been determined on the basis of what is known about the single elements.
- (4) Essentially the Graebner reconstruction of the history of civilization is only partly inductive. In the main, it is not the outcome of a gradual synthesis of investigations of narrower scope. It emerged without preliminaries and virtually complete from the first. The detailed evidence in its behalf has been nearly all [presented subsequently, in ratification or expansion of the ready-made theory. Very largely this has been the genesis also of the migration hypothesis of Elliot Smith, Rivers, and Perry, which agrees with the Graebner-Ankermann-Schmidt theory in certain of its methodological assumptions, even though its concrete content is different. Essentially, therefore, in spite of their greater modernity, these theories pursue the same method of preconception and subsequent substantiation by selected evidence as the unilinear evolutionistic explanations of the older orthodox anthropology.

The Graebner method then is not "the method of culture history"; it is only one special form of this method, characterized by the outright denial of possible value to the principles of convergence and distributional coherence and by the assumption that cultures can be adequately resolved into mixtures of a few large units. In this last assumption lies the fundamental methodological quality. Graebner and his supporters work with factors that are themselves nothing but undocumented composites—much like the earth, air, fire, and water with which the ancients saved themselves the determination of the elements with which scientific chemistry operates. In other words, the Graebner method leaps at synthesis before it has pursued exhaustive analysis. In this it differs, to name only one example, from Wissler's "American Indian," the method of which is also that of thoroughly non-evolutionistic and non-psychological culture history. It is much easier and more sensational, when one is confronted by hundreds of culture elements, to weld these rapidly into less than a dozen great masses and then to manipulate these blocks, than to follow out in detail the intricate history of the elements.

While the Graebner plan of operating with a few large, composite units of hypothesis results in a plausible scheme as long as one remains on a level of merely



outlining culture history in wide sweeps, most of his detailed discussions, and those of Schmidt, it will be noted, refer after all to single culture elements and not to whole cultures as they actually exist as entities. As soon as such real cultures are examined by his method, an interminable tangle results which would require an ever-increasing number of special hypotheses to fit the facts. With such special hypotheses, it is true, Graebner is chary; but at the cost of not having really elucidated the course of development of any single actual culture. Two examples will illustrate.

The Chumash and Luiseño are two groups belonging to the southern sub-culture of the California area.<sup>1</sup> The Chumash had bee-hive houses and coiled basketry—features of the “Australian” complex; the spear-thrower—West Papuan; the plank canoe—East Papuan; the double-bladed paddle, which they share with the Eskimo but which does not appear in any of the complexes postulated by Graebner, and would therefore belong to still another culture or migration wave. Their social organization has been lost but may have been based on moieties. The Luiseño practise “Tasmanian” cremation; throw a sort of boomerang, which would be “Australian”; are divided into patrilineal local groups—West Papuan; have a secret society (though without masks) and a death cult (though without particular reference to skulls)—both East Papuan traits; make pottery, which would be due to the Melanesian or a later complex; and practise the Mediterranean bow-release, which in America has been reported only from the Eskimo, and from its distribution would seem to be Eurasian in origin and post-Polynesian. This makes a sufficiently complicated resolution of the culture mass of each of the two tribes by the Graebner method.

But we are only beginning. The two tribes live almost in geographical juxtaposition, and have without dissent been looked upon as similar. Yet the Luiseño lack these traits of the Chumash: the Australian bee-hive house; the West Papuan spear-thrower; and the East Papuan moieties which the Chumash may have had (they are extinct now). The Chumash, on the other hand, lack these Luiseño traits: the Tasmanian cremation; the Melanesian or subsequent pottery; and perhaps the Australian boomerang, the West Papuan local exogamic groups, the East Papuan secret society, the post-Polynesian bow-release. Now an explanation of these differences would necessarily be intricate, because it would have to account for the particular traits which the Luiseño and Chumash respectively retained and lost, or failed to acquire from the half-dozen great culture complexes which reached both of them. That is, a number of special subsidiary hypotheses would have to be devised to explain the differences. If on the other hand these differences are not accounted for, Luiseño and Chumash culture as such is really not explained at all.

The contention is not that Oceanic and Asiatic influences failed to reach these Californian tribes, or that it is unsound to try to trace them. But it does seem a

<sup>1</sup> This culture area, like all those usually recognized by Americanists, is of purely empirical ethnographic determination, without reference to theories of its origin or development in time.



fair point that there is something arbitrary about a method which correlates two Californian cultures with Oceania, but cannot correlate them with each other.

The second example may also be initiated in California. There are in this region peoples with exogamous totemic moieties without local groups, and with local groups; with non-exogamous moieties; with totemic unlocalized groups and with non-totemic localized groups. All these are patrilineal.<sup>1</sup> Besides there are peoples without totems, groups, moieties, or exogamy, but with some inclination to recognize matrilineal descent. A similar variability obtains in the contiguous Southwest. There are tribes that are patrilineal (Pima), matrilineal (Hopi), totemic (Keres), non-totemic (Navaho), dually divided (Tewa), and moietyless (Zuñi). In the quite separate area of the Northwest Coast there are similar conditions; descent is matrilineal (Haida), patrilineal (Salish), and compromised (Kwakiutl); moieties obtain (Tlingit) or fail (Tsimshian). And so in eastern North America, in an area which is again geographically discrete, we find matrilineal and patrilineal reckoning, clans alone or moieties, totemic and non-totemic groups, among adjacent and otherwise similar tribes.

All this sounds like Australia, where Graebner accounts for the analogous variability in social organization as the result of the colliding and intermingling of two chronologically separate strata of migrants or cultures, the West Papuan and East Papuan. The same sort of collision should then account for the phenomena in the Southwest-California, Northwest Coast, and Atlantic-Mississippi regions. But how then about the Arctic, Mackenzie, Columbia, Great Basin, and Texas areas, in which moieties, clans, totems, and exogamy are altogether lacking? Either the West and East Papuan cultures never reached these tracts, or they did reach them and were subsequently wholly obliterated, while in the three first mentioned areas both of them entered, collided, and were both preserved. There is a lot here that is unexplained and difficult to explain, without piling new assumptions on the original Graebnerian ones.

The most general fact in the welter is that in three separate areas in North America, and a fourth in Australia-Melanesia, we find the supposed hall-marks of West Papuan and East Papuan social organization, not only among contiguous tribes, but actually blended among single tribes, whereas in intervening areas both are wanting. That is, we have a definite correlation for the "West Papuan" and "East Papuan" complexes, both as to occurrence and non-occurrence. So far as social organization is concerned, the two alleged culture complexes or migrational streams are not two but one.

In fact, there is no compelling reason for assuming any Graebnerian complex or migration or diffusion at all. For the three North American areas of totemic exogamy such diffusion from a single origin may seem likely, though it is as yet supported neither by documents nor by serious internal evidence. But to derive

<sup>1</sup> Gifford, *Univ. Calif. Publ. Am. Arch. Ethn.*, XIV, 155-219, 1918.



the North American block and the Australian-Melanesian block from a single source in the face of all the intervening masses of peoples that have remained unaffected by this source, is as purely speculative as any assumption ever made by a psychological evolutionist.

That the matrilineate is a mere episode in the history of human civilization, as the Graebnerians claim, does seem extremely likely. But its episodic character can be established with economy of hypothesis on the basis of the distribution of the matrilineate and equivalent or analogous features of social organization. That is, the matrilineate evidently tended to develop where and when definite patrilineal reckoning, totems, clans, and moieties developed, and usually only in association with them or some of them. What the Graebner scheme superadds is the assertion that the episode did not possibly occur two or three or four times in human history, but that it happened only once as the consequence of the development of a single culture which originated under unknown circumstances in an unknown region, spread for unknown reasons, and survived or died out in this and that place from unknown causes.

There are undoubtedly many particular affirmations in the Graebner scheme that will prove true or that possess stimulative value. As a whole, however, the conception is a fabric of the imagination; as appears from its failure to correlate with any anthropological conclusions but its own. It almost wholly disregards physiographic and climatic environment. It makes no serious attempt to localize the beginnings or specify the spread of its culture complexes. It does not explain the origin of their diversity. And it makes no provision for reintegrating the results of culture history, after they have been attained by purely cultural means, with the psychology that underlies cultural phenomena. In short, it condenses the history of a large part of the world into a sort of formula, forgetting that so far as formulæ can be used in history at all, they are obviously applicable to its mechanisms and not to its events.

## MISCELLANEA.

## PROCEEDINGS OF THE ROYAL ANTHROPOLOGICAL INSTITUTE, 1920.

*January 27th, 1920.*

Annual General Meeting. (See p. 1.)

*January 13th, 1920.*

Ordinary Meeting at 50, Great Russell Street.

Sir EVERARD IM THURN, President, in the Chair.

The minutes of the last meeting were read and confirmed.

The election of the following as Ordinary Fellows of the Institute was announced: Mr. Guy Maynard, Mr. S. P. O'Donnell, Mr. Edward Dean, Miss M. K. Lander.

Dr. HADDON read his paper, "The Outriggers of Indonesian Canoes," illustrated by lantern slides.

The paper was discussed by Mr. HAMBLY, Mr. NORTHCOTE THOMAS, Captain FULLER, Dr. STRONG and the PRESIDENT, and Dr. HADDON replied.

The best thanks of the meeting were accorded to Dr. HADDON for his interesting and important paper, and the Institute adjourned till February 17th.

*February 17th, 1920.*

Ordinary Meeting at 50, Great Russell Street.

Sir EVERARD IM THURN, President, in the Chair.

The minutes of the last meeting were read and confirmed. The election of the following as Ordinary Fellows of the Institute was announced: Mr. R. C. Staples-Brown, Mr. H. E. Lawford, Major W. T. Shorthose, and Mr. T. Gordon Thomas.

Mr. J. REID MOIR read his paper on "The Occurrence of Flint Implements in the Glacial Boulder Clay of Suffolk," illustrated by lantern slides and specimens.

The paper was discussed by Professor KEITH, Mr. REGINALD SMITH, Dr. BARNES, Mr. KENNARD, Mr. ACLAND and Mr. H. BURY, and Mr. REID MOIR replied.

The thanks of the meeting were returned to Mr. MOIR for his paper, and the Institute adjourned till March 16th.

*March 16th, 1920.*

Ordinary Meeting at 50, Great Russell Street.

Sir EVERARD IM THURN, President, in the Chair.

The minutes of the last meeting were read and confirmed.



The election of the following as Ordinary Fellows of the Institute was announced : Captain John Ball, Mr. A. W. Cardinall, Mr. W. B. Grubb, Mr. R. J. Hunt, Mrs. C. M. Lloyd, Captain E. W. Martindell, Mr. T. F. McIlwraith, Contesse Jean de Pange.

Surgeon-Lieut. R. BUDDLE exhibited some flint implements he had discovered at Archangel and read reports on them from Mr. M. C. BURKITT and Mr. H. BALFOUR.

Mr. N. W. THOMAS read his paper on "The Ovia Secret Society," illustrated by lantern slides and phonograph records.

The paper was discussed by Mr. DENNETT, Mr. TORDAY, Mr. BRIERLEY and the PRESIDENT, and Mr. THOMAS replied.

The thanks of the meeting were accorded to Mr. THOMAS for his paper and to Lieut. BUDDLE for his interesting exhibit, and the Institute adjourned till March 23rd.

*March 23rd, 1920.*

Joint Meeting with the Prehistoric Society of East Anglia at the Rooms of the Geological Society, Burlington House, at 3 p.m. The afternoon programme was provided by the Prehistoric Society of East Anglia, when the President of the Society, Professor J. E. MARR, gave his Presidential Address on "Man and the Glacial Period."

A paper on "Flat-based Celts from Kent, Hampshire and Dorset," was read by Mr. H. DEWEY.

Dr. A. E. PEAKE exhibited specimens found at Grimes Graves in 1919.

At 6 p.m., Sir EVERARD IM THURN, President of the Institute, in the Chair.

The minutes of the last meeting were read and confirmed.

Professor ARTHUR KEITH gave his paper on "How far Cranial Characters can help in estimating the Antiquity of Human Remains," illustrated by lantern slides and diagrams.

The paper was discussed by Professor SOLLAS, Dr. HADDON, Sir HENRY HOWORTH, Professor PARSONS and the PRESIDENT, and Professor KEITH replied.

The hearty thanks of the meeting were given to Professor KEITH for his very interesting and important paper, and the Institute adjourned till April 13th.

*April 13th, 1920.*

Special Meeting at 50, Great Russell Street.

Sir EVERARD IM THURN, President, in the Chair.

The minutes of the last meeting were read and confirmed.

Mr. A. O. NEVILLE, Chief Protector of Aborigines of Australia, read his paper on "The Western Australian Aborigines, their Treatment and Care," illustrated by lantern slides.

The paper was discussed by Dr. CORNEY, Mr. THOMAS, Professor KEITH, Mr. RAY, Miss FREIRE MARRECO and the PRESIDENT, and Mr. NEVILLE replied.

The hearty thanks of the meeting were accorded to Mr. NEVILLE for his interesting paper, and the Institute adjourned till April 20th.

*April 20th, 1920.*

Sir EVERARD IM THURN, President, in the Chair.

The minutes of the last meeting were read and confirmed.

Mr. R. GRANT BROWN read his paper on "The Races of the Chindwin," illustrated by lantern slides.

The paper was discussed by Colonel SHAKESPEAR and the PRESIDENT.

The thanks of the meeting were accorded to Mr. GRANT BROWN and Colonel SHAKESPEAR and the Institute adjourned till May 18th.

*May 18th, 1920.*

Ordinary Meeting at 50, Great Russell Street.

The minutes of the last meeting were read and confirmed.

The election of the following as Ordinary Fellows of the Institute was announced : Mrs. Agnes C. L. Donohugh, Mr. Robert Neill, Mr. A. F. Wollaston, Captain Mumford, and Mr. S. Nanjee.

Sir HENRY HOWORTH read his paper on "Buddhism in the Pacific," illustrated by lantern slides.

The paper was discussed by Dr. CORNEY, Mr. RAY, Mrs. ROUTLEDGE, Captain HOCART, Dr. FORBES and the PRESIDENT, and Sir HENRY HOWORTH replied.

The hearty thanks of the meeting were accorded to Sir HENRY HOWORTH and the Institute adjourned till June 1st.

*June 1st, 1920.*

Special Meeting at 50, Great Russell Street.

Mr. S. H. RAY, Vice-President, in the Chair.

The minutes of the last meeting were read and confirmed.

An interesting exhibit of Implements from Hawaii, New Zealand and Australia were made by Miss A. C. BRETON.

Dr. MALINOWSKI read his paper on "The Economic Pursuits of the Trobriand Islands," illustrated by lantern slides.

The paper was discussed by Dr. SELIGMAN, Sir JAMES FRAZER, Mrs. ROUTLEDGE, Dr. MYERS and Mr. RAY ; Dr. MALINOWSKI replied.

The hearty thanks of the meeting were accorded to Miss BRETON for her exhibit, to Dr. MALINOWSKI for his very interesting and important paper, and the Institute adjourned until June 15th.

*June 15th, 1920.*

Ordinary Meeting at 50, Great Russell Street.

Professor KEITH, Past President, in the Chair.

The minutes of the last meeting were read and confirmed.



The election of the following as Ordinary Fellows of the Institute was announced : Miss W. S. Blackman, Mr. G. Bryans, Mr. C. T. Elliott, Mr. A. G. Hemming, Mr. B. Lloyd, Dr. N. A. Sprott, Mr. F. G. M. Wetherell.

Professor PARSONS read his paper on "The Distribution of Hair and Eye Colour in the British Isles," illustrated by lantern slides.

The paper was discussed by Professor KEITH, Dr. BROWNLEE, Mr. PEAKE, Dr. SHRUBSALL, Dr. STANNUS, and Professor PARSONS replied.

The hearty thanks of the meeting were given to Professor PARSONS for his valuable and interesting paper, and the Institute adjourned until the next Session.

*October 26th, 1920.*

Ordinary Meeting at 50, Great Russell Street.

Professor F. G. PARSONS, Vice-President, in the Chair.

The minutes of the last meeting were read and confirmed.

The Rev. REGINALD A. LORRAIN gave his lecture on "The Wild Head-Hunting Tribes of Lakherland, their Manners and Customs," illustrated by coloured lantern slides.

The lecture was discussed by Professor PARSONS, Colonel SHAKESPEAR, Mr. GRANT BROWN, and Mr. ROBERTS, and Mr. LORRAIN replied.

The thanks of the meeting were accorded to Mr. LORRAIN, and the Institute adjourned till November 9th.

*November 9th, 1920.*

Special Meeting at 50, Great Russell Street.

Mr. S. H. RAY, Vice-President, in the Chair.

The minutes of the last meeting were read and confirmed.

Dr. W. H. R. RIVERS read his paper on "The Origin of Hypergamy."

The paper was discussed by Dr. SELIGMAN, Colonel T. C. HODSON, Dr. MACINTOSH, Professor PARSONS, Mr. BRAUNHOLTZ and Mr. RAY, and Dr. RIVERS replied.

The hearty thanks of the meeting were given to Dr. RIVERS for his very interesting paper, and the Institute adjourned till November 23rd for the Huxley Lecture.

*December 7th, 1920.*

Special Meeting at 50, Great Russell Street.

Professor F. G. PARSONS, Vice-President, in the Chair.

The minutes of the last meeting were read and confirmed.

The election of the following Ordinary Fellows of the Institute was announced : Rev. H. R. Barrish, Mr. C. J. J. T. Barton, Rev. H. L. Bishop, Dr. George Chaikin, Mr. Edward de Maries, Major W. R. Foran, Mr. P. B. Haigh, Rev. George S. Hitchcock, Mr. L. K. Anantha Krishna Iyer, Mr. J. B. I. Mackay, Professor R. A. S. Macalister, Mr. Chas. K. Meek, Mr. W. F. Mindham, Miss Mary Mond, Captain G. A. J. Nevill, Mr. John Ritchie, Mr. W. W. Ritchie, The Hon. Christopher G. Tennant, and Rev. W. C. Willoughby.

Mr. L. S. PALMER read his paper on "Some Keltic Remains in a Mendip Cave." The paper was illustrated by slides and various finds were exhibited.

The paper was discussed by Professor PARSONS, Professor KEITH, Mr. PEAKE and Mr. PARKYN, and Mr. PALMER replied.

The hearty thanks of the meeting were accorded to Mr. PALMER for his very interesting paper, and the Institute adjourned till December 14th.

*December 14th, 1920.*

Ordinary Meeting at 50, Great Russell Street.

Mr. H. J. E. PEAKE in the Chair.

The minutes of the last meeting were read and confirmed.

The election of the following as Ordinary Fellows of the Institute was announced : Miss D. R. Howard, Mr. N. M. Penzer, Mr. F. H. Rogers, Mr. W. S. Walker.

Captain L. W. G. MALCOLM read his paper on "The Ethnography of the Central Cameroons," illustrated by lantern slides.

The paper was discussed by Dr. HARRISON, Mr. BRAUNHOLTZ, Captain FULLER and Mr. PEAKE, and Captain MALCOLM replied.

The best thanks of the meeting were accorded to Captain MALCOLM for his interesting paper, and the Institute adjourned till January 11th, 1921.





# INDEX.

NOTE.—The Numbers in ordinary type refer to the pages; the numbers in Clarendon type are the reference numbers of MAN, 1920; where necessary the page references to MAN are added in brackets. Except when otherwise indicated, entries which refer to reviews are shown in italics. For a full list of reviews refer to the CONTENTS of MAN. For collected references, see especially *Archæology, Linguistics, Religion, Technology.*

## A.

Aberavon skull, 23.  
 Abyssinian skulls, 17.  
 Accounts for year 1919, 8.  
 Acklam Wold skull, 24.  
 Africa: *Bantu languages*, 7; Nilotic languages, 327; Wayao relationships, 369;  
 Africa, Central: Mackie Expedition, 11, 48, 90; musical instrument, 20;  
 Africa, E.: canoes, 67; Africa, N.: Algerian oil mills, 59; gunflints, 18;  
 Africa, N.E.: skulls from, 17; Africa, S.: Implement-bearing deposits, 412;  
 Africa, W.: Benin wooden block, 53; duodecimal base, 14, 32; Edo burial cushions, 377; gold weights, 52; linguistics, 3, 92; Mende drum signals, 22; numerals, 47; physical anthropology, 60; the Edo week, 73; W. Saharan archæology, 49; Yoruba folklore, 23, 24.  
 "Africanoid" type in Europe, 16 ff., 29.  
 Agriculture: amongst the Bairu, 90 (183); in Cyprus, 188.  
 Ajija (the Dust-Devil), Yoruba, 24.  
 Akem gold weights, 52.  
 Alaska: *Anthropology*, 8.  
 Algeria: gun-flints, 18; oil mills, 59.  
 Allée Couverte, Paris, 2.

Alpine type in Cyprus, 198.  
 America, C.: *Archæology*, 34; America, N.: *age societies*, 41; Lagoa Santa type, 18; Mexican archæology, 69; Stoney Indians, 36; America, S.: *Ethnography*, 43; loom from Iquitos, 62; rock carvings, 31; *see also* Masks and Moieties, 452.  
*American Journal Physical Anthropology*, 16, 75.  
 Ancestor worship: Bahima, 48; British New Guinea, 241 ff.; Nayar, 25.  
 Andaman Is., *see* Canoes.  
 Animal sacrifice, Edo, 379 ff.  
*Animism, or Thought-Currents of Primitive Peoples*, 40.  
 Annual General Meeting, Minutes of, 1.  
 Anthropological Expeditions, Central Asia and Malta, 93.  
 Anthropology: *An Introduction to*, 86; and *History*, 94; British Association, Cardiff, 1920, 78; colour index, 159; *see also* Neanthropic, Physical Anthropology, Anthropometry.  
 Anthropology of Cyprus, The, L. H. Dudley Buxton, 183; agriculture, 188; Alpine type, 198; basketry, 188; Bronze Age, 185, 197; bullroarer, 191; census, 191; cultural conditions, 185;



- demography, 191; Early Iron Age, 185; Famagusta ware, 188; geography, 183; granaries, 188; history, 184; houses, 189; ideograms used, 190; languages, 191; loom, 186; Mediterranean type, 198; musical instruments, 190; negro infusion, 200; physical anthropology, 193; plough, 188; potter's wheel, 189; pottery-making, 187; religions, 192; skulls, 197; spinning, 186; tables of measurements, 202 ff.; tribulum, 188.
- Anthropometry: colour index, 159; Cyprus, 183; Neanthropic types, 12.
- Antiquities, Macedonia, 30.
- Arab skulls, 17.
- Archæological Research, Motya, 89.
- Archæology: Allée Couverte, 2; at British Association, 78 (158); bird-chariots, 153; Chinese bronze, 1; Cornwall, 61; dolman of Déhus, 66; Easter Island, 27; flint implements, 135; Gloucestershire, 64; gold objects, Ireland, 45; Graig-lwyd Committee, 21; Macedonia, 30; Maltese Cart-ruts, 54; Maya, 34; Mexico, 10, 69; Neolithic implements, 46; Portugal, 16; Pre-Palæolithic man, 56; rude stone monuments, 44; Sahara, 49; Sicily, 89; stone circle, Eyam Moor, 19; stone mould, S. Wales, 37; Wayland Smith cave, 4; see also Bronze Age, Cyprus, Megaliths, Neanthropic, Stone Age.
- Architecture in Cyprus, 189.
- Armstrong, E. C. R.: Gold objects from Lattoon, 45.
- Art: Bird-chariots, 153; Chinese bronze, 1; see also Decorative art.
- Aryans, 63.
- Ashanti and Baule Gold Weights, N. W. Thomas, 52.
- Ashdown Park, Sarsen stones, 4.
- Asia: Anthropological Expedition, 93; Chinese bronze, 1; leopard-men in the Naga Hills, 41; Asia, C.: *Exploration*, 70; Asia, W.: Climate in Palæolithic times, 31; see also Canoes, Cyprus.
- Astronomy: India, 77.
- Augieras, Capt.: Sahara Occidental (*reviewed*), 49.
- Aurignacian skulls, see Neanthropic, 12.
- Australia, C.: reservations for aborigines, 95.
- Australians: masks and moieties, 452; skulls, 18.
- Avebury, Sarsen stones, 4.
- B.
- Badaga and Toda Months, 13.
- Bahima, ethnography of, 48.
- Bahuma, ethnography of, 90.
- Bairu, ethnography of, 90.
- Bakaua ceremonies, 241, 272.
- Bakyiga tribe, 48 (94).
- Balfour, H.: *rev. of* Mystery of Easter Island, 27.
- Balinese attachment of outrigger-boom 73 ff.
- Baltic area and the Nordic type, 34.
- Balum cult, 241.
- Bamu ceremonies, 243, 258.
- Banaro ceremonies, 255, 274.
- Bantu and Semi-Bantu Languages, 7.
- Bantu origins, 7 (14).
- Banyoro, ethnography of, 90.
- Bari language, 327.
- Barma Grande skull, 21.
- Basevi, W. H. F.: Burial of the Dead, 55.
- Basketry, Cyprus, 188.
- Bass Strait, Tasmania, Inhabitants of Cape Barren Is., 71.
- Baule and Ashanti Gold Weights, 52.
- Beaker-folk settlements, 33.
- Beddoe's work on colour index, 159 ff.
- Benin, objects from, 53.
- Betrothal customs, Bunyoro, 90 (184).
- Binandele ceremonies, 250, 270.
- Bird-Chariots and Socketed Celts in Europe and China, C. G. Seligman, 153.
- Bird-cult, Easter Is., 27.
- Bird-man, see Orongo, 425, 448.
- Birth customs, Bunyoro, 90 (185).
- Bolinder, G.: Tropiska Snöfjällets Indianer (*reviewed*), 43.
- Bonser, Wilfred: Three Annual Fêtes at Boulogne, 82.



- Borli ceremonies, 249, 267.  
 Borneo, outrigger canoes of, 115.  
 Borris skull, 22.  
 Boulder Clay, Flint Implements in, 135.  
 Boulogne Fêtes, 82.  
 Brabrook, Sir E.: Obituary note of A. L. Lewis, 91.  
 Breton, A. C.: Mexican Picture Map, 10, 69; Dr. S. A. Lafone y Quevedo, obituary notice, 84; Stoney Indians, 36; *revs. of*: American Journal Physical Anthropology, 16, 75; Maga Indians, 34; Museum Journal, 8.  
 Breuil, M. l'Abbé: Doctor of Letters, degree conferred, 65.  
 British Isles: Colour Index of, F. G. Parsons, 159; *see also* Archaeology, Neanthropic Types, 12.  
 British New Guinea, Migrations of Culture in, A. C. Haddon, 237: culture of:—Bakaua, 241, 272; Bamu, 243, 258; Banaro, 255, 274; Binandele, 250, 270; Borli, 249, 267; Dirimu, 239; Elema, 245, 260; Goaribari, 243, 259; Gogodara, 240, 257; Goi-efu, 250, 268; Jabim, 241, 272; Kai, 253, 272; Kerewa, 258; Kiwai, 239; Koita, 245; Koko, 249, 269; Mafulu, 250, 271; Mailu, 247, 265; Masingle, 239, 257; Massim, 248, 265; Mawai, 268; Motu, 245; Namau, 244, 260; Orokawa, 249, 269; Sepik, 244; Suau, 247; Tami, 253, 272; Toaripi, 261; Tugeri, 238, 257.  
 Bronze Age: Bird-chariots, 153; Cyprus, 185; gold objects from Ireland, 45; megaliths, France and Guernsey, 66 (131); skulls, 24; Swedish skulls, 26.  
 Bronze bracelets, Macedonia, 30.  
 Bronzes of China and Japan, 81 (164).  
 Brunn skull, 19.  
 Brux skull, 19.  
 Bullroarer: Cyprus, 191; New Guinea, 238 ff.  
 Burial: Customs, Edo, 377; *of the Dead*, 55; in dolmens, 66 (132).  
 Burrow, E. J.: Ancient Entrenchments and Camps of Gloucestershire (*reviewed*), 64.  
 Bushman implements, 412, 422.  
 Buxton, L. H. Dudley: Anthropology of Cyprus, 183.
- C
- Calendars, Dravidian, 13.  
 Cameroons Province, Numerals of the Eghap and Bali Tribes, 47.  
 Cannibalism: British New Guinea, 238 ff.; West Africa, 408.  
 Canoe burial, West Africa, 410.  
 Canoes, Outrigger, 67.  
 Canoes, The Outriggers of Indonesian, A. C. Haddon, 69; bibliography, 131; Balinese attachment, 73 ff.; canoes of Borneo, 115; Celebes, 112; Halmahera, 110; Java, 98; Kei Is., 106; Moluccas, 107; Philippine Is., 114; Sulu Archipelago, 113; Sumatra, 98; Sunda Is., 106 (and Africa, Andaman Is., Ceylon, Madagascar, Oceania, etc., *passim*); conclusions, 119; direct attachment of float, 83 ff.; double canoes, 77; Halmaheran attachment, 90, 129; indirect attachment of float, 73 ff.; Indonesian outriggers, map of distribution, 71; mixed attachment of float, 84 ff.; Moluccan attachment, 89, 129; native names of canoes and outriggers, 97; outlayers of canoes, 76; outrigger, origin of, 121; outriggers, single and double, distribution of, 78; outrigger-booms, attachment to hull, 82; definitions of, 73; number of, 79; outrigger-floats, 73 ff.; racial history of Indonesia, 120; spars of outriggers, 72; terminology, 72; weather-platforms, 76; *see also* Contents, 69, and illustrations.  
 Cat's cradles, Papuan, D. Jenness, 299.  
 Cattle and their milk: Bahima tribe usages, 48 (92); Bunyoro customs, 90 (182).  
 Cauldron-chariot, Greek, 157.



- Celebes, outrigger-canoes of, 112.  
 Celts: socketed, and bird-chariots, 153;  
*see also* Bronze Age, Stone Age.  
 Census of Cyprus, 191.  
 Cephalic index, Cyprus, 197 ff.  
 Ceremonies: British New Guinea, 238 ff.;  
 Edo burial, 377.  
 Ceylon, *see* Canoes.  
 Chancelade skull, 20, 289, 298.  
 Cheddar skull, 22.  
 Chemistry, Oriental, 81.  
 Chikashige, Masumi: Ancient Oriental  
 Chemistry and its Allied Arts, 81.  
 China: ancient chemistry, 81; bird-  
 chariots, 153; bronze, 1.  
 Chinese Bronze with Scythian Affinities,  
 1.  
 Circumcision in New Guinea, 241 ff.  
 Clachair skulls, 23.  
 Clark, W. E. Le Gros: Ancient Eskimo  
 skulls from Greenland, 281.  
 Climate of Europe in Palæolithic times, 30.  
 Colour Index of the British Isles, F. G.  
 Parsons, 159: army deserters, 174;  
 British Isles, 176; colour-index and  
 sex, 164; England, 170; Great  
 Britain, 171; Ireland, 178; red hair,  
 180; town and country; Wales, 172;  
*see also* tables and charts.  
 Colour: of flints in boulder-clay, 141;  
 of hair and eyes, Cyprus, 210 ff.  
 Combe Capelle: skull, 20 ff.; type in  
 Spain, 16.  
 Cooper, L., and Sir Herbert Gibson:  
 Rock carvings, Paraguay River, 31.  
 Corney, B. Glanville: An Historic Stone  
 Bowl, 52.  
 Cornwall, uncharted village in, 61.  
 Council's Report for 1919, 2.  
 Counting: W. Africa, 14, 32, 47.  
 Coutil, Leon, and Lewis, A. L.: *Allée  
 Couverte*, Paris, 2.  
 Cowries and gold, 42.  
 Crania, Bronze Age, Cyprus, 197.  
 Craniometry: Cyprus, 194; Eskimo, 281,  
 292; *see also* Physical Anthro-  
 pology.  
 Cro-Magnon skulls, 19 ff.  
 Crooke, W.: *revs. of*: Aryans, the, 63;  
 Glossary of the Tribes and Castes of the  
 Punjab, 87; Hindu Year, 6; Through  
 Deserts and Oases of Central Asia, 70.  
 Cuddapa, Women's Cloths, 72.  
 Cultural Conditions of Cyprus, 185.  
 Culture Complex, Masks and Moieties as  
 a, 452.  
 Cultures, Migrations of, in British New  
 Guinea, A. C. Haddon, 237.  
 Cunningham, M. E.: Stone Mould from  
 South Wales, 37.  
 Cure for serious illness, Yoruba, 23.  
 Cyprus, Anthropology of, L. H. Dudley  
 Buxton, 183.
- D.
- Daggers of bone, Maori and Moriori, 29.  
 Dances: *see* Edo burial customs, 377.  
 Dartford skull, 22.  
 Decorative Art: Chinese bronze, 1;  
 gold objects from Ireland, 45; Maori,  
 29, 39; stone mould from South  
 Wales, 37; women's cloths, S. India,  
 72.  
 Decoy for water-buck, Nyasaland, 20.  
 Déhus, Human Figure, 66.  
 Demography of Cyprus, 191.  
 Denise skull (fragment), 20.  
 D'Entrecasteaux Archipelago, cat's  
 cradles, 300.  
 Dinka language, 328.  
 Dirimu ceremonies, 239.  
 Dolichocephalic types, *see* Neanthropic,  
 12.  
 Dolmens: France, 2 (5); Guernsey, 66.  
 Door-latch, Cyprus, 189.  
 Dove-chariots, China, 153.  
 Dragon, *Evolution of the*, 42.  
 Dravidian calendars, 13.  
 Drum signals, Mende, 22.  
 Duckworth, W. H.: Obituary notice of  
 R. Livi, 68.  
 Duodecimal numeration, 14, 32.  
 Durham, M. E.: Ritual Nudity in  
 Europe, 83.



## E.

- Early Iron Age : Cyprus, 185.  
*Easter Is. : the Mystery of*, 27; *see also* Orongo, 425.  
 Ebberston skull, 24.  
 Edo : Burial Customs, Notes on, 377; week, 73.  
 Elema ceremonies, 245, 260.  
 Eliot Smith, G. : Evolution of the Dragon (*reviewed*), 42.  
 Engis skull, 21.  
 England : Archaeology, 19; Cornwall, archaeology, 61; Eyam Moor stone circle, 19; *Gloucestershire Archaeology*, 64; Suffolk, flint implements, 135; Wayland Smith's cave, 4; *see also* Colour Index, Neanthropic types.  
*Entrenchments and Camps of Gloucestershire*, 64.  
*Environment and race*, 15.  
 Eskimo Skulls, Ancient, from Greenland, W. E. Le Gros Clark, 281; Chancelade skull, 289, 298; Magdalenians and Eskimo, 288; orbits and facial height, 285; palatal contours, 296; scaphocephaly, 282; tables of measurements, 292-298; type contours, English, Eskimo, Neolithic, Tasmanian, 283.  
 Ethnography : Mackie Expedition, 11, 48, 90; *Maya*, 34; New Guinea trading, 51; *South America*, 43; Stoney Indians, 36.  
 Europe : antiquities from Macedonia, 30; bird chariots, 153; Neanthropic types in, 12; Sicily, Archaeology, 89; *the passing of the great race*, 85.  
*European History, Racial Basis of*, 85.  
 Evans, I. H. N. : Malay beliefs, Kempanan, 38.  
*Evolution : and World Power*, 15; *of the Dragon*, 42.  
 Exogamy : Fiji, 12; *see also* Masks and Moieties, 452.  
 Eye-colour : British Isles, 160; Cyprus, 210.  
 Eyam Moor stone circle, 19.

## F.

- Fallaize, E. N. : Anthropological Expeditions to Central Asia and Malta, 93; obituary notice of Dr. Robert Munro, 74; *rev. of Pre-Palæolithic Man*, 56.  
 Famagusta ware, Cyprus, 188.  
 Fenton, E. G. : Maltese cart-ruts, 54.  
 Fêtes at Boulogne, 82.  
 Fiji : totemism and exogamy, 12.  
 Fijian skulls, 18.  
 Fleure, H. J. : Some early Neanthropic Types in Europe, and their Modern Representatives, 12; *revs. of : Anthropology and History*, 94; Sahara occidental, 49.  
 Flint implements : Neolithic floor, Ipswich, 46; *see also* Stone Age, and below.  
 Flint Implements of Man in the Glacial Chalky Boulder Clay of Suffolk, J. Reid Moir, 135; colour of implements, 141; geological data, 135; Marr, J. E., on the geology, 137; Mousterian type of the implements, 140, 142 ff.; pits 1, 2 and 3, 135-138; points, 143; racloirs, 144; scrapers, 145; striated flints, 139; various forms of implements, 148.  
 Flutes, sacred, British New Guinea, 252 ff.  
 Fly River ceremonies, 242.  
*Folk-lore : Evolution of the dragon*, 42; fêtes at Boulogne, 82; *Kiwi folk-tales*, 26; ritual nudity in Europe, 83; Yoruba, 23, 24; *see also* Leopard-men.  
*Folk-Tales of the Kiwi Papuans*, 26.  
 France : Allée Couverte, 2; fêtes at Boulogne, 82; long-heads, 37; Neolithic skulls, 28.  
 Frazer, Sir J. G. : Doctor of Letters, degree conferred, 65.  
*Frigate-bird Cult in Pacific*, 27 (47).

## G.

- Galley Hill skull, 19, 21.  
 Gamoda, *see* Kava.  
 Gann, T. W. F., *Maya Indians (reviewed)*, 34.



- Genealogies of Tasmanian half-castes, 71.  
 Geography of Cyprus, 183.  
 Germany, prehistoric skulls, *see* Ne-anthropic.  
 Gibson, Sir Herbert and L. Cooper : Rock Carvings, Paraguay River, 31.  
 Gilmore, G. W. : *Animism, or Thought-Currents of Primitive Peoples*, 40 (*reviewed*).  
 Girara, *see* Gogodara.  
 Glacial Chalky Boulder Clay of Suffolk, Flint Implements in, 135.  
*Glossary of the Tribes and Castes of the Punjab*, 87.  
*Gloucestershire, entrenchments and camps*, 64.  
 Goaribari ceremonies, 243, 259.  
 Gogodara ceremonies, 240, 257.  
 Goi-efu ceremonies, 250, 268.  
*Gold and cowries*, 42.  
 Gold objects, Irish, 45.  
 Gold weights, Ashanti and Baule, N. W. Thomas, 52.  
 Goodenough Is. cat's cradles, 300.  
 Graig-lwyd Excavation Committee, 21.  
 Granaries in Cyprus, 188.  
 Grant, Madison : *Passing of the Great Race (reviewed)*, 85.  
 Gray, H. St. George : *rev. of Entrenchments and Camps of Gloucestershire*, 64.  
 Great Britain, *see* Colour index, 159.  
 Greece, cauldron-chariot, 157.  
 Greeks and Turks in Cyprus, 191.  
 Greenland, Eskimo skulls from, 281.  
 Grenelle skull, 20.  
 Grimaldi skull, 19.  
 Guérin, T. W. M. de : *Sculptured Human Figure of Dolmen of Déhus*, 66.  
 Guernsey, *Sculptured Human Figure, Déhus*, 66.  
 Gun-flints, Algeria, 18.  
 Haddon, A. C. : *Migrations of Culture in British New Guinea (Huxley Lecture, 1920)*, 237 ; *The Outriggers of Indonesian Canoes*, 69.  
 Hair-colour : British Isles, 159 ; Cyprus, 210.  
 Halling sku., 22.  
 Halmahera : attachment of outrigger float, 90, 129 ; outrigger canoes of, 110.  
 Hamitic languages, 327.  
 Hand-axes, South Africa, 414, 421.  
 Hartland, G. S. : *revs. of* : *Burial of the Dead*, 55 ; *Tropiska Snöfjällets Indianer*, 43.  
 Head measurements, Cyprus, 193 ff.  
 Heathery Burn skull, 23.  
 Helperthorpe skull, 24.  
 Hildburgh, W. L. : *rev. of Observatories at Delhi*, 77.  
 Hilton-Simpson, M. W. : *Gun-flint making in Algeria*, 18 ; *Two Primitive Algerian Oil Mills*, 59.  
*Hindu : Calendar*, 6 ; *year*, 6.  
 History of Cyprus, 184.  
 Hocart, A. M. : *Various Definitions of Totemism in Fiji*, 12 ; *rev. of Plains Indian Age Societies*, 41.  
 Holt, Catharine, and Kroeber, A. L. : *Masks and Moieties as a Culture Complex*, 452.  
*Homo euraficanus*, 18.  
 Hornell, J. : *Common Origin of the Outrigger Canoes of Madagascar and East Africa*, 67.  
 Huntington, E. : *World power and Evolution (reviewed)*, 15.  
 Hutton, J. H. : *Leopard-men in the Naga Hills*, 41.  
 Huxley Memorial Lecture, 1920, 237.  
 I.  
 Iberian peninsula, skulls from, 16, 28.  
 Ideograms in Cyprus, 190.  
 Illness and magic : Bahima, 43 ; Bunyoro, 90.

## H.

- Habitations : Cyprus, 189 ; Orongo, Easter Is., 425.

Implement-bearing deposits of Taungs and Tiger Kloof in the Cape Province of South Africa, On the, Neville Jones, 412.  
 India: *Astronomy*, 77; *Calendar*, 6; *Dravidian calendar*, 13; *Linguistics*, 87; *Nayar ancestor-worship*, 25; *the Aryans*, 63; *women's cloths*, 72.  
 Indians, Stoney, 36.  
 Indonesia: and Edo burial customs, 408; canoes, 69; racial history of, 120; *see also* Masks and Moieties, 452.  
 Initiation ceremonies, New Guinea, 238, 240 ff.  
*Introduction to Anthropology*, 86.  
 Ipswich: Neolithic floor, 46; skull, 22.  
 Iquitos, loom, 62.  
 Ireland, *see* Colour index, 159.  
 Irish gold objects, 45.  
 Iron Age skulls, Sweden, 26.  
 Iron swords, Japan, making of, 81.

J.

Jabim ceremonies, 241, 272.  
 James, E. O.: *Introduction to Anthropology (reviewed)*, 86.  
 Japan: Ancient chemistry, 81.  
 Java, outrigger canoes, 98.  
 Jenness, D.: *Papuan Cat's Cradles*, 299.  
 Johnston, Sir H. H.: *Bantu and Semi-Bantu Languages (reviewed)*, 7.  
 Jones, Neville: *On the Implement-bearing deposits of Taungs and Tiger Kloof in the Cape Province of South Africa*, 412.

K.

Kabiri, *see* Gogodara.  
 Kai ceremonies, 253, 272.  
 Kaia-Kaia, *see* Tugeri.  
 Kava in New Guinea, 238 ff.  
 Kaye, G. R.: *Observatories at Delhi (reviewed)*, 77.  
 Kei Is., outrigger canoes, 106.  
 Keiss skulls, 25.  
 Keith, A.: *Nationality and Race (reviewed)*, 33.

Kennedy, J.: *The Aryans (reviewed)*, 63.  
 Kennet skull, 24.  
 Kerewa Ceremonies, 258.  
 Kings, sacred, of the Bunyoro, 90.  
 Kiwai: ceremonies, 239; *folk-tales*, 26.  
 Koita ceremonies, 245.  
 Koko ceremonies, 249, 269.  
 Kopiravi, 244.  
 Kroeber, A. L., and Holt, C.: *Masks and Moieties as a Culture Complex*, 452.  
 Kula (exchange of valuables, New Guinea), 51.  
 Kurgans: distribution of, 33; skulls from, 26.

L

Lagoa Santa skull, 18.  
 Landtman, G.: *Folk-Tales of the Kiwai Papuans (reviewed)*, 26.  
 Langton Wold skull, 24.  
 Languages: Cyprus, 191; Nilotic, 327.  
 Langwith skull, 22.  
 Lautsch skull, 20.  
 Ledbury Hall skull, 23.  
 Leopard-men in the Naga Hills, J. H. Hutton, 41.  
 Lewis, A. L.: *Allée Couverte*, Paris, 2.  
 Limba Prefixes, 3.  
 Linguistics: Africa, W., 73, 92; *Bantu*, 7; *Cameroons*, numerals, 47; *Cyprus*, 191; *duodecimal base*, 14, 32; *India*, 87; *Malay*, 38; *Nilotic*, 327; *Sierra Leone*, 3; *see also* *Canoes*, *Edo burial*, *Gold weights*, *Wayao*.  
 Livi, Ridolfo, obituary notice of, 68.  
 Loess areas in Europe, 30.  
 Long-heads, French and British, 37.  
 Loom: Cyprus, 186; Iquitos, 62.  
 Louisiade Is., trading in, 51.  
 Lowie, R. H.: *Plains Indian Age Societies (reviewed)*, 41.  
 Lycanthropy, Naga Hills, 41.

M.

Macarthur skull, 21.  
 Macedonian Antiquities, 30.



- Mackie Ethnological Expedition, 11, 48, 90.  
 Madagascar, Outrigger Canoes, 67.  
 Mafulu ceremonies, 250, 271.  
 Magdalenians : and Eskimo, 288 ; skulls,  
*see* Neanthropic types.  
 Magic : and clothing, S. India, 72 ;  
 Bahima, 48 ; British New Guinea, 237,  
 51 (100) ; Bunyoro, 90 ; in warfare,  
 5 (11) ; *see also* Leopard-men, Religion.  
 Mailu ceremonies, 247, 265.  
 Malay Beliefs, 38.  
 Malcolm, L. W. G. : The Numerals of the  
 Eghap and Bali Tribes, Cameroons  
 Province, 47 ; Physical Anthropology  
 of the Munchi, 60 ; Inhabitants of  
 Cape Barren Island, Bass Strait, 71.  
 Malinowski, B. : Kula, New Guinea, 51 ;  
 War and Weapons among the Natives  
 of the Trobriand Islands, 5.  
 Malta : Anthropological Expedition, 93 ;  
 cart-ruts, 54.  
 Mambule, *see* Mafulu.  
 Mana Expedition, *see* Orongo, 425.  
 Maori : Daggers, 29 ; textiles, 39.  
 Marr, J. E., on boulder-clay near Ipswich,  
 137.  
 Marriage customs, Bunyoro, 90 (184).  
 Marshall Is. Chart, 8 (16).  
 Masai languages, 327.  
 Masingle ceremonies, 239, 257.  
 Masks and Moieties as a Culture Complex,  
 A. L. Kroeber and Catharine Holt, 452.  
 Masks in British New Guinea, 238 ff.  
*passim*.  
 Massim : ceremonies, 248, 265 ; trading, 51.  
 Mathematics : duodecimal system, 14.  
 Mawai ceremonies, 268.  
 Maya Indians, 34.  
 McDougall, W. : Anthropology and His-  
 tory (*reviewed*), 94.  
 Mediterranean : area, climate in Palaeo-  
 lithic times, 30 ; type of man, 36, 198 ;  
*see also* Colour index, 159.  
 Megaliths : Allée Couverte near Paris,  
 2 ; Avebury, 4 ; Committee for  
 classification of, 44 ; Easter Is., 27 ;  
 France, 66 (131) ; Guernsey, 66 ;  
 stone circle, Eyam Moor, 19.  
 Melanesians, *see* Masks and Moieties, 452.  
 Mende drum signals, 22.  
 Menhirs : France and Guernsey, 66 (131).  
 Menon, V. K. Raman : Ancestor Worship  
 among the Nayars, 25.  
 Metal-work, *see* Bird-chariots.  
 Mexican : buildings, ancient, 10 ; picture  
 map, 10, 69.  
 Migeod, F. W. H. : Mende drum signals, 22.  
 Migrations of Cultures in British New  
 Guinea, A. C. Haddon (Huxley Lecture,  
 1920), 237.  
 Miscellanea : Proceedings of the Institute  
 for 1920, 461.  
 Moieties, Masks and, as a Culture Com-  
 plex, 452.  
 Moir, J. Reid : Early Neolithic Floor,  
 Ipswich, 45 ; On the Occurrence of  
 Flint Implements of Man in the Glacial  
 Chalky Boulder Clay of Suffolk, 135 ;  
 Pre-Palæolithic Man (*reviewed*), 56.  
 Mollusca, Neolithic, 46 (87).  
 Moluccan attachment of outrigger float,  
 89, 129.  
 Moluccas, outrigger canoes of, 107.  
 Motu ceremonies, 245.  
 Motya, Archaeological Research, 89.  
 Mounds in Central America, 34 (63).  
 Mousterian implements : from Boulder-  
 clay, 140, 142 ff. ; South Africa, 417.  
 Muckle Heog Kist skull, 24.  
 Mummification in W. Africa, 408.  
 Munchi, Physical Anthropology of, 60.  
 Munro, Robert : Obituary notice of, 74.  
 Murray, G. W. : The Nilotic Languages,  
 327.  
 Museum Journal (Univ. of Pennsylvania),  
 8.  
 Music : at Edo burials, 410 ; Mende drum  
 signals, 22.  
 Musical Instruments : Central Africa, 20 ;  
 Cyprus, 190.  
 Muskham skull, 22.  
 Mystery of Easter Island, 27.
- N.
- Naga Hills, Leopard-men in, 41.  
 Namau ceremonies, 244, 260.



- Nandi language, 327.  
*Nationality and Race*, 33.  
 Nayar Ancestor Worship, 25.  
 Neanthropic Types in Europe and their Modern Representatives, Some Early, H. J. Fleure, 12:—Africanoid type in Europe, 16, 29; America, S., Lagoa Santa type, 18; Baltic area and the Nordic type, 34; beaker-folk settlements, 33; climate of Europe, W. Asia and N. Africa in Palæolithic times, 30; Combe Capelle type in Spain, 16; conclusions, 39; France, long-heads, 37; *Homo euraffricanus*, 18; Kurgans, distribution of, 33; loess areas, 30; long-heads, French and British, 37; Mediterranean type, 36; Nordic type, 34; pigmentation and light, 35; Plylmon region, characters of population, 12; population, centres of, in early times, 33; red robbers of Mawdwy, 16; Russia, head form in, 34; Sahara in Palæolithic times, 29; skulls referred to:—Aberavon, 23; Abyssinian, 17; Acklam Wold, 24; Arab, 17; Australian, 18; Barma Grande, 21 ff.; Borris, 22; Bronze Age, 24; Brünn, 19; Brüt, 19; Chancelade, 20; Cheddar, 22; Clachaig, 23; Combe Capelle, 20 ff.; Cro-Magnon, 19 ff.; Dartford, 22; Denise, 20; Ebberston, 24; Engis, 21; Fijian, 18; Neolithic (France), 28; Galley Hill, 19; Grenelle, 20; Grimaldi, 19 ff.; Halling, 22; Heathery Burn, 23; Helpertorpe, 24; Iberian, 16, 28; Ipswich, 22; Iron Age (Sweden), 26; Keiss, 25; Kennet, 24; Kurgan, 26; Lagoa Santa, 18; Langton Wold, 24; Langwith, 22; Ledbury Hall, 23; Lautsch, 20; Macarthur, 21; Muckle Heog Kist, 24; Muskham, 22; Neolithic, 23; Nether Swell, 24; Nether Urquhart, 24; Obercassel, 20; Ofnet, 19; Papa Westray, 24; Predmost, 20; River-bed, 23; Rodmarton, 23; Sardinian, 17; Somaliland, 17; Stængenaes, 21; Swedish, 25; Torlin, 23; Uley, 23; West Kennet, 24.  
 Negro infusion in Cyprus, 200.  
 Neolithic Age: dolmen, Guernsey, 66; Graig-lwyd, 21; Ipswich floor, 46; skulls, 23, 285.  
 Nether Swell skulls, 24.  
 Nether Urquhart skull, 24.  
 New Guinea: British, Migrations of Culture in, 237; cat's cradles, 299; *Kiwai folk-tales*, 26; Kula, 51; *see also* British New Guinea, Canoes.  
 New Zealand: Maori daggers, 29; textiles, 39.  
 Nicholson, S.: Women's Cloths, Cuddapa District, 72.  
 Nicobar Is., *see* Canoes.  
 Nilotic Languages, The, G. W. Murray, 327 (*see* Contents, p. 327).  
 Nordic: *peoples*, 85; type, 34, 36; *see also* Colour Index, 159.  
 Notes on Edo Burial Customs, N. W. Thomas, 377.  
 Nubian languages, 327.  
 Nudity, Ritual, in Europe, 83.  
 Numerals, Cameroons Province, 47.  
 Numeration, duodecimal, 14, 32.  
 Nyasaland: relationships amongst the Wayao, 369.
- O.
- Obercassel skulls, 20.  
*Observatories at Delhi*, 77.  
 Oceania: *Easter Is.*, 27; Fijian totemism, 12; Maori daggers, 29, and textiles, 39; skulls, 18; Trobriand Is., 5; *see also* British New Guinea, Canoes, New Guinea.  
 Ofnet skull, 19.  
 Oil mills, Algerian, 59.  
 Orbital height and facial height, 285.  
 Oriental chemistry, 81.  
 Orokaiva ceremonies, 249, 269.  
 Orongo, Easter Is., Survey of the Village and Carved Rocks of, by the Mana Expedition, 425.  
 Outlayers of Canoes, 76.  
 Outrigger: Canoes, 67; floats, 73; origin of, 121; single and double, distribution of, 78.



## P.

- Pacific Is.: *see* British New Guinea, New Guinea, New Zealand, Orongo, Trobriand Is.
- Palæolithic Age: climate, 29; implements, 135; *Portugal*, 16; types of skulls, 19.
- Palatal contour, Eskimo, 296.
- Papa Westray skull, 24.
- Papua, *see* British New Guinea, 237, and New Guinea.
- Papuan Cat's Cradles, D. Jenness, 299.
- Papuans, *see* Masks and Moieties, 452.
- Papuo-Melanesians, *see* British New Guinea, and New Guinea.
- Paraguay River, rock carvings, 31.
- Parsons, F. G.: Colour Index of the British Isles, 159; *rev. of* Nationality and Race, 33.
- Passing of the Great Race*, 85.
- Passmore, A. D.: Wayland Smith Cave, Sarsen stones at Ashdown Park and Avebury, 4.
- Pastoral tribes of Africa (Bahima and Bahuma), 48, 90.
- Peake, H. J. E.: *revs. of* Introduction to Anthropology, 86; *Passing of the Great Race*, 85.
- Petrie, W. M. F.: *rev. of* Evolution of the Dragon, 42.
- Philippine Is., outrigger canoes of, 114.
- Physical Anthropology: *American Journal*, 16; *Central America*, 34; colour index of British Isles, 159; Cyprus, 193; Eskimo, 281; Greeks, ancient, 78 (157); Londoners, modern, 78 (157); Munchi, 60; *Nationality and Race*, 33; Neanthropic types, 12; *Passing of the Great Race*, 85; Tasmanians, 71.
- Pictography in Cyprus, 190.
- Picture Map, Mexican, 10, 69.
- Pigmentation and light, 35.
- Plains Indian Age Societies, 41.
- Plants, Neolithic, 46 (88).
- Plough in Cyprus, 188.
- Plynlymon region, characters of population, 12 ff.
- Polynesia, *see* Orongo.

- Polynesians, *see* Masks and Moieties, 45.
- Population: centres of, in early times, 33; of Cyprus, 193.
- Portugal: Archaeology*, 16.
- Portuguese influence in West Africa, 53.
- Potter's wheel, Cyprus, 189.
- Pottery-making, Cyprus, 187.
- Predmost skull, 20.
- Prefixes in Limba, 3.
- Prehistory: *see* Archaeology, Bird-chariots, Bronze Age, Neanthropic, Stone Age.
- Proceedings of the Institute for 1920, 461.
- Punjab, Glossary of Tribes and Castes*, 87.

## Q.

- Quevedo, S. A. Lafone y, Obituary notice of, 84.

## R.

- Racial Basis of European History*, 85.
- Read, Sir C. Hercules: A Chinese Bronze with Scythian Affinities, 1.
- Red hair, distribution of, in Great Britain and Ireland, 180.
- Red Robbers of Mawddwy, 16.
- Relationships amongst the Wayao, Meredith Sanderson, 369.
- Religion: and clothing, S. India, 72; and culture, 76; animism, 40, 76; Bahima, 48; Banyoro, 90; burial of dead, 55; Cyprus, 192; Edo burial, 377; fêtes at Boulogne, 82; Fijian, 12; Nayar, 25; *see also* Magic, Folklore.
- Research Committees, 5.
- Richards, F. J.: Badaga and Toda Months, 13.
- Ridgeway, Sir W., and Skinner, H. D.: Two Wooden Maori Daggers, 29.
- Ritual Nudity in Europe, 83.
- River-bed skulls, 23.
- Rock-carvings: Orongo, 425, 448; Paraguay River, 31.
- Rodmorton skulls, 23.
- Rose, H. A.: Glossary of the Tribes and Castes of the Punjab (*reviewed*), 87.



Roth, H. Ling : A loom from Iquitos, 62 ;  
Maori decorative work, 39.

Routledge, Mrs. Scoresby : Mystery of  
Easter Island (*reviewed*), 27 ; Survey  
of the Village and Carved Rocks of  
Orongo, Easter Is., by the Mana  
Expedition, 425.

Rude Stone Monuments : *see* Megaliths.

Russia, head form in, 34.

## S.

Sahara : in Palaeolithic times, 29 ; *occidental*, 49.

Sanderson, Meredith : Relationships  
amongst the Wayao, 369.

Sardinian skulls, 17.

Sarsen Stones, Ashdown Park and Ave-  
bury, 4.

Scaphocephaly of Eskimo skulls, 282.

Schleiter, F. : Religion and Culture  
(*reviewed*), 76.

Scotland : prehistoric skulls, *see* Nean-  
thropic ; *see also* Colour index, 159.

Scrapers (*racloirs*) from Boulder Clay, 144.  
*Script, Easter Is.*, 27.

Seligman, C. G. : Bird-chariots and  
Socketed Celts in Europe and China,  
153.

Sepik ceremonies, 244.

Series of ancient Eskimo skulls from  
Greenland, On a, W. E. Le Gros Clark,  
281.

Sex and colour index of British Isles, 159.  
Shakespeare, Col. : Note on Lycanthropy,  
51.

Shell ornaments in trade, S. E. New  
Guinea, 51.

Shepherd's pipe, Cyprus, 190.

Shilluk languages, 327.

Shrubsall, F. : *rev. of* World Power and  
Evolution, 15.

Skinner, H. D., and Ridgeway, Sir W. :  
Two Wooden Maori Daggers, 29.

Skull-cult, West Africa, 408.

Skulls : Cyprus, 197 ; Eskimo, 281 ;  
Neanthropic, 12 ff. ; Neolithic, 23 ff.

Sociology : Edo burial customs, 377 ; re-  
lationships, Wayao, 369 ; trading in  
S. E. New Guinea, 51 ; *see also*  
British New Guinea.

Socketed Celts, Bird-chariots and, in  
Europe and China, C. G. Seligman, 153.

Solar chariot, 155.

Somaliland, skulls from, 17.

Spain, Combe Capelle type in, 16.

Spinning in Cyprus, 186.

Stængenaes skull, 21.

Stannus, H. S. : Musical Instrument from  
Central Africa, 20.

Stature, Cyprus, 198 ff.

Stone Age : implements, Ipswich, 46 ;  
Macedonia, 30 ; South Africa, 412 ;  
Suffolk, 135 ; Wales, 21 ; *see also*  
Megaliths, Neanthropic, Palaeolithic.

Stone bowl, Tahiti, 52.

Stone circle, Eyam Moor, 19.

Stone mould, Wales, 37.

Stoney Indians, 36.

Striated flints in Boulder Clay, 139.

Suau ceremonies, 247.

Succession, Wayao, 370.

Sudan languages, 327.

Sudanic names for the domestic fowl, 92.

Suffolk, flint implements in, 135.

Suk language, 327.

Sulu Archipelago, outrigger canoes of, 113.

Sumatra, outrigger canoes, 98.

Sunda Is., outrigger canoes, 106.

Swedish skulls, 25.

Sykes, P. and E. : Through Deserts and  
Oases of Central Asia (*reviewed*), 70.

## T.

Tahiti : stone bowl, 52.

Tami ceremonies, 253, 272.

Tasmanian skulls, contour, 285.

Tasmanians, *see* Masks and Moiety, 452.

Taungs, Cape Province, stone implements,  
412.

Technology : Algerian oil mills, 59 ;  
bird-chariots, 153 ; *British Honduras*,  
34 ; canoes, 69, 67 ; China and Japan,



ancient chemistry, 81; gold weights, 52; gun-flints, Algeria, 18; India, textiles, 72; loom, Iquitos, 62; Maori daggers, 29; and textiles, 39; musical instrument, C. Africa, 20; stone bowl, Tahiti, 52; Trobriand Is., 5; *see also* Archaeology, Flint Implements, Masks and Moieties, Migrations of Culture, Orongo, Stone Age.

Thomas, N. W.: Ashanti and Baule Gold Weights, 52; duodecimal base, 14, 32; Edo week, 73; notes on Edo burial customs, 377; prefixes and pronouns in Limba, 3; Sudanic names for the domestic fowl, 92; *revs. of*: Animism, 40; Religion and culture, 76.

*Through Deserts and Oases of Central Asia*, 70.

Tiger Kloof, Cape Province, stone implements, 412.

Toda and Badaga Months, 13.

Torlin skull, 23.

Torres Straits: *see* British New Guinea.

Totemism: British New Guinea, 244 ff.; Central Africa, 48; Fiji, 12; *North America*, 8; *see also* Edo Burial customs, Masks and Moieties, Wayao.

Toys, Cyprus, 191.

Trading in Trobriand Is., 51.

Treasurer's Report for 1919, 5.

Tribulum in Cyprus, 188.

Trobriand Is., trading in, 51; war weapons, 5.

*Tropiska Snöfjällets Indianer*, 43.

Tugeri ceremonies, 238, 257.

Turks and Greeks in Cyprus, 191.

Twins, customs relating to, Bunyuru, 90.

Type contours of skulls, Eskimo, Tasmanian, English, and Neolithic, 283.

U.

Uley skull, 23. \*

Underhill, M. M.: Huian Year (*reviewed*), 8.

V.

Vullianey, C. E.: An Uncharted Village in Cornwall, 61.

W.

Wales: Archaeology, 21; stone mould, 37; *see also* Colour index, Neanthropic.

War weapons, Trobriand Islands, 5.

Wayao, Relationships amongst the, 369.

Wayland Smith cave, 4.

Weather-platform of canoes, 76.

Weaving: Cyprus, 186; Maori, 37.

Were-leopards, Naga Hills, 41.

Were-tigers, 41.

Weights, gold, 52.

Werner, A.: *rev. of* Bantu and Semi-Bantu Languages, 7.

West Kennet skulls, 24.

Whitaker, J. J. S.: Archaeological Research at Motya, 89.

Widows: *see* Edo burial customs, 377.

Wilson, J. S., and Garfitt, G. A.: Stone Circle, Eyam Moor, 19.

Women's cloths, South India, 72.

*World Power and Evolution*, 15.

Y.

Yao, *see* Wayao.

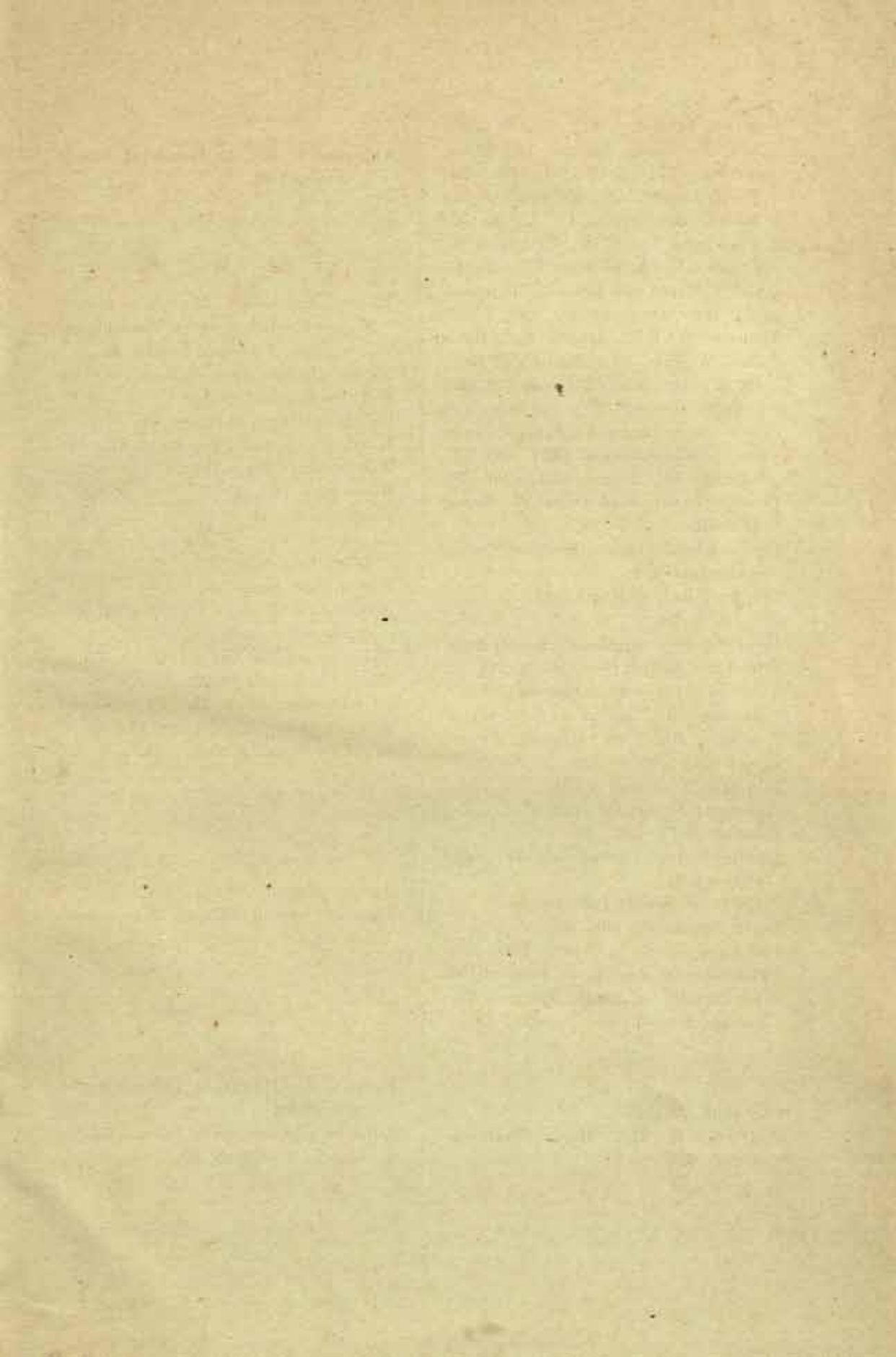
Yoruba: cure for illness, 23; *see also* Edo burial customs, 377.

Z.

Zammit, T., Doctor of Letters, degree conferred, 79.

Zeller on gold weights in Ashanti, 52.

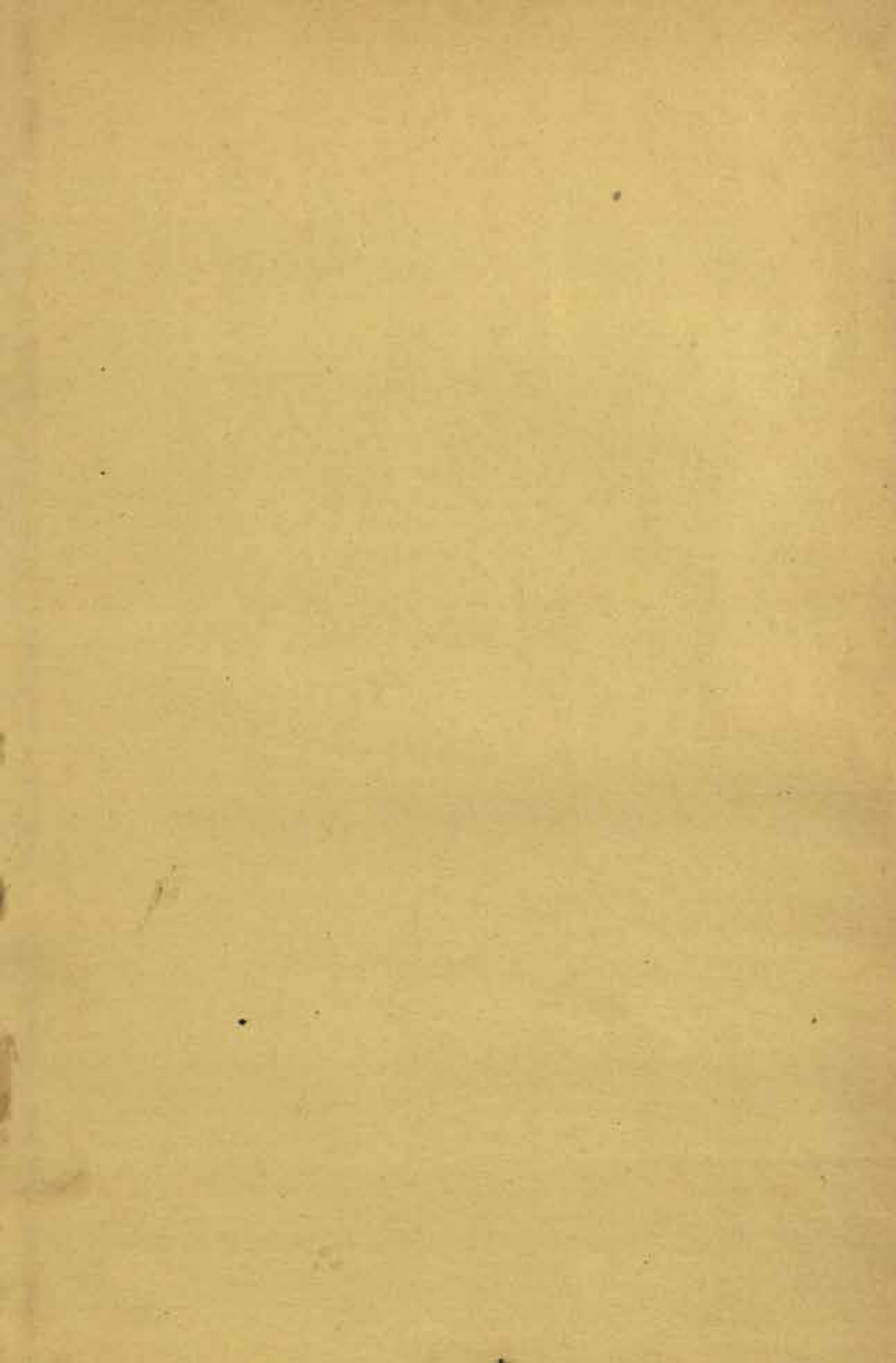
Zylophone, Nyasaland, 20.





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